New Value Chain in the Prescription Drug Industry:
a Mandate to Change

by

Yoshihito Takahashi

Bachelor of Science in Pharmaceutical Sciences from
Osaka University of Pharmaceutical Sciences, Osaka, JAPAN (1990)

Submitted to the Sloan School of Management
in Partial Fulfillment of the Requirements for the Degree of

Master of Science in Management of Technology
at the

Massachusetts Institute of Technology
June 2000

© Yoshihito Takahashi 2000
ALL RIGHTS RESERVED

The author hereby grants to MIT permission to reproduce and to distribute publicity
paper and electric copies of this thesis document in whole or in part.

Signature of Author

MIT Sloan School of Management
May 19, 2000

Certified by

Stan N. Finkelstein, Senior Research Scientist
MIT Sloan School of Management
Thesis Supervisor

Accepted by

David, A. Weber
Director, Management of Technology Program
New Value Chain in the Prescription Drug Industry:
a Mandate to Change

by

Yoshihito Takahashi

Submitted to the Sloan School of Management
in Partial Fulfillment of the Requirements for the Degree of Master of
Science in Management

Abstract

This thesis focuses on an analysis of strategy in the prescription drug industry. For prescription drug companies, the ultimate consumers are patients, but intermediate customers are physicians. Because of regulations and the particular decision making process of choosing pharmaceuticals, the marketing activity of drug companies have focused on physicians and introduced their products to them. However, because of deregulation, the emergence of health maintenance organizations (HMOs), which aim to reduce health care costs, the value chain of prescription drug industry has been changing. Accordingly, prescription drug companies have been re-evaluating the traditional value chain of the industry. They have to invest in a more important part, and to establish a new business model.

This paper will focus mainly on a prescription drug market, discussing a new value chain and its demand for change. This paper explains the increasing need for direct-to-consumer (DTC) advertising, which includes information technology and e-commerce, in contrast to the industry's traditional marketing.

Thesis Supervisor:  Stan N. Finkelstein
Senior Research Scientist
Introduction .................................................................................................................. 6
Regulation by the government ....................................................................................... 7
The studies of prescription drug industry ........................................................................ 8

1. PRESCRIPTION DRUG INDUSTRY ANALYSIS ...................................................... 11

1.1. PORTER'S FIVE FORCES MODEL OF THE INDUSTRY ..................................... 11
Porter Force 1: Intensity of Competition ........................................................................ 11
Porter Force 2: Presence of Substitute Products .......................................................... 12
Porter Force 3: Power of Buyers .................................................................................... 13
Porter Force 4: Power of Suppliers .............................................................................. 15
Porter Force 5: New Entry ........................................................................................... 15

1.2. AN OUTLINE OF THE COMPANY ......................................................................... 16
    1.2.1. Research and Development .............................................................................. 16
    1.2.2. Marketing and Sales ........................................................................................ 17
    1.2.3. Manufacturing and Delivering ......................................................................... 19

2. MCO AND PRESCRIPTION DRUG SUPPLY CHAIN ........................................... 20
    Health Maintenance Organization (HMO) ................................................................ 20
    Preferred Provider Organization (PPO) .................................................................... 21
    Emergent of Pharmaceutical Benefit Manager (PBM) ............................................. 21

2.1. GROWTH OF THE MANAGED CARE .................................................................. 23
2.2. PHARMACY COST SURGE AND CONTROLS .................................................. 24
    2.2.1. Product Limitations ........................................................................................ 25
    2.2.2. Member Cost-sharing Arrangements .............................................................. 25
        Copayments ........................................................................................................ 25
        Coinsurance ........................................................................................................ 26
        Deductibles ......................................................................................................... 26

2.3. MEDICARE AND MEDICAID ............................................................................. 26
3. DIRECT TO CONSUMER MARKETING CHANNEL ................................................................. 28

3.1. THE VALUE CHAIN OF PHARMACEUTICAL INDUSTRY ........................................... 28

Biotechnology company and Contact-Research Organization (CRO) .................................. 29

3.2. DIRECT-TO-CONSUMER MARKETING CHANNEL .................................................. 29

3.2.1. FDA Regulations Allowing Pharmaceutical Companies to Advertise More Freely .......... 30
Guideline for Industry Consumer-Directed Broadcast Advertisements ............................... 31

3.2.2. Attitude and Opinion of DTC .............................................................................. 32

Consumer ......................................................................................................................... 32
Physicians ......................................................................................................................... 33
MCO ................................................................................................................................. 34
FDA ................................................................................................................................. 34

3.2.3. Branding of Prescription drugs ............................................................................. 35

Brand-name Decision ......................................................................................................... 35

3.2.3.1. When does DTC Advertising work best? .............................................................. 37

Market size ....................................................................................................................... 37
Competitors ....................................................................................................................... 38
Types of disease ............................................................................................................... 38
Real advantage ............................................................................................................... 38

3.2.4. Media of DTC advertisement .............................................................................. 39

3.2.4.1. TV-commercials ................................................................................................. 39
3.2.4.2. Newspaper and Magazine Advertisement for DTC ........................................... 40
3.2.4.3. Rebate .................................................................................................................... 41
3.2.4.4. Internet Advertising ............................................................................................. 42

4. PHYSICIAN BASED MARKETING CHANNEL ............................................................. 44

4.1. IN-PERSONAL DETAILING ....................................................................................... 44

The role of sales representatives ....................................................................................... 45
Argument of in-personal detailing .................................................................................... 46

4.2. CONSUMER BUYING MODEL OF PRESCRIPTION DRUG ...................................... 47
5. MARKETING ACTIVITY TO MCOS ................................................................. 52

5.1. CONSIDERATION OF MCO BUSINESS OBJECTIVES ........................................ 52

5.2. ACTIVITIES BY HMO/PBM ACCOUNT EXECUTIVES FOR ADOPTION ON THE “FORMULARY” ................................................................. 53

   Price strategy ........................................................................................................ 53

   Originality strategy (non-price strategy) ................................................................. 54

   Differentiation strategy (non-price strategy) .......................................................... 54

5.3. COST-BENEFIT ANALYSIS .............................................................................. 54

5.4. ALLIANCE AND ACQUISITION WITH MCO .................................................. 55

6. FUTURE OF THE PRESCRIPTION DRUG BUSINESS AND THE INTERNET .......... 57

6.1. ONLINE PHARMACY ......................................................................................... 58

   6.1.1. FDA regulation of pharmacy ......................................................................... 59

   6.1.2. Future of Online Drugstore ......................................................................... 60

6.2. THE PRESENT CONDITION OF THE PRESCRIPTION DRUG COMPANIES ........ 61

   6.2.1. Application of IT for knowledge management and marketing (Prescription drug

          company’s B2B) ............................................................................................... 62
Introduction

A prescription drug is a particular kind of drug prescribed by physician's word and dispensed by pharmacists, and given to patients with a view to medical treatment or diagnosis. Prescription drugs are regarded as a part of medical service. (See Figure 1: Prescription Flow) The prescription flow starts with physicians, and ends patient, underlying the emerging patient record. By contrast, the drugs that customers can easily purchase in a drug store without prescription are called over-the-counter (OTC) drugs or non-prescription drugs.

The US retail drugstore industry was about a $165 billion industry, broken down into prescription drugs ($90 billion), OTC medications ($20 billion), personal care products ($20 billion), and beauty aid and cosmetic products ($15 billion).¹ The market for prescription drug is roughly four to five times greater than that of the OTC drug market.

It is natural that marketing activity focuses on decision-maker for purchasing. For prescription drug companies, the decision-makers have not been patients, but physicians. Therefore, the marketing activities of the pharmaceutical
companies historically have not stood out for the general public, but widely
performed by medical professionals.

However, the environment for pharmaceutical marketing is changed. There
are some new situations where patients can get information on prescription drugs.
In last two decades, many managed care organizations (MCOs), health maintenance
organizations (HMOs), preferred provider organizations (PPOs), and the emergence
of Pharmaceutical Benefit Managers (PBM)s, which aim to reduce health care cost,
interposed themselves among pharmaceutical companies, medical doctors, and
patients, and began to play a major part in the prescription drug industry.

**Regulation by the government**

Pharmaceuticals are indispensable to human health. However, if the
pharmaceuticals were used in inappropriate ways, they may damage human health.
Although degrees are various in the countries, pharmaceutical advertisements are
regulated in most countries. In European countries and Japan, prescription drug
advertisement for the general public is not permitted. In the US, the ban on DTC
advertisement has been lifted. The way and the scope of pharmaceutical
advertisement are still regulated by the government in the most countries.
Governments heavily regulate advertising of pharmaceutical drugs to prevent
misunderstanding in the general public.

There is another big environmental change in the prescription drug industry.
After the Food and Drug Administration (FDA) remove a ban in Television
advertisements in 1997, the prescription drug companies began to compete on TV.
Also, the revolution of the Internet technology allows patients to easily get information about the drugs prescribed by their doctors. (See Chapter 3) Under these situations, patients have begun to pay attention to their prescription drugs.

This paper will underscore the importance of marketing for prescription drug companies because they have to recapture huge R&D costs in short period. (See Chapter 1) In the prescription drug companies’ point of view, they are stripped of an important tool for marketing. I will discuss the details of direct-to-consumer advertisement regulation in the chapter 3.

The studies of prescription drug industry

Over the past few decades, a considerable number of studies have been conducted on the analysis of the prescription drug industry. These are roughly sorted out in three categories depending on the different proposes as follows. This paper focuses on the corporate management approach.

• The corporate management approach

First, the corporate management approach examine for growing sales, market share, and revenue with developing customer relationship, from a pharmaceutical company's perspective. These analyses also focus on each functions of corporation, such as R&D, manufacturing, marketing, sales and corporate administration.

• Medical-economics approach

Second, the medical economics approach takes a firm stance on how to maximize the medical-economic value. This category has a growing literature on
economic evaluation in health care. This analysis is important, especially for health care insurance companies, health management organizations (HMOs), and the government.²

The identification of various types of costs and their subsequent measurement in dollars is similar across most economic evaluations. However, the nature of the consequence stemming from the alternatives being examined may differ considerably. These are categorized as cost-minimization analysis, cost-effectiveness analysis, cost-benefit analysis and cost-utility analysis.

As will be seen later, many managed care organizations (MCOs), such as HMOs, provide medical services to its members through cost-saving managed health care practices. These companies intentionally choose the most cost-effective prescription drugs to realize both patient benefits and their own profitability. In order to correspond this trend, the prescription drug companies also began to pay attention, preparing medical-economics data for their products.

- The industrial organization approach

Third is the industrial organization approach. The government, its advisory committees, and industrial organizations face these studies for improving national welfare through normal growing of the prescription drug industry. For example, the studies or proposals for shortening FDA review periods of new drugs, and alleviation of regulation belong to this category.

The outcome of pharmaceutical R&D activity is relatively understandable because new excellent drugs are good measure of the success. On the other hand, for
the person who is not in the pharmaceutical industry, the marketing and sales
activities of the industry is conservative and difficult to understand because of its
peculiar business customs, but there are few reports explaining pharmaceutical
marketing.

This paper focuses on prescription drug marketing. I explain resent issues
related to the prescription drug marketing and then present a proposal for a
marketing strategy as follows:

- How the value chain of prescription drug industry is changing.

- How should the industry invest, discussing a new value chain and company's
  required correspondence of their new business model.
1. Prescription Drug Industry Analysis

In order to understand the entire pharmaceutical company activity, this chapter briefly presents information of the prescription drug industry.

1.1. Porter's Five Forces Model of the Industry

Analyzing the many environmental factors and accurate understanding the whole industry are important for strategic planning. One way to organize information about an industry that shows the potential attractiveness of that industry is "the Five Forces Model" developed by Michael Porter.³ (See Appendix, Figure 2: Porter's Five Forces Model) Taken together, the five forces shown in the figure help to explain the overall level of profitability one might expect in the prescription drug industry. Porter's model suggests that, to a large extent, these industry differences can be explained by five factors: the current intensity of competition, the presence of substitute products, the power of buyers, the power of suppliers and new entry.

Porter Force 1: Intensity of competition

In the US market, approximately 30 to 40 major pharmaceutical companies compete in the prescription drug market, with the top five in the industry accounting for only 28 percent of the sales in the industry. (See Appendix, Table 1: 1999 Performa


**Pharmaceutical Company Ranking** This number reflects many recent mergers and acquisitions.

Not only prescription drug market is a highly fragmented one, but there are many generic prescription drug companies, which are much smaller companies. They exist in the same market. Considering other countries, the market is much more fragmented. In Japan, roughly one hundred prescription drug companies divide the market share.

Market share of each prescription drug company is unstable because even large companies depend on sales of their several top-sales products. If approval for the particular drug is retracted by the FDA, the company must withdraw the product immediately. It means that the prescription drug companies experience huge uncertainty about their profitability. On the other hand, if a company has a promising product, it can join the top ten or twenty large prescription drug companies.

Intense rivalry among firms in the prescription drug industry will reduce average profitability. However, the following factors of “the Five Forces Model” will explain this industry’s profitability. *(See Appendix, Table 2: Return Differences Among Industries)*

**Porter Force 2: Presence of substitute products**

According to Michael Porter, firms are also affected by competition from related markets. A cinema industry was influenced by spreading of a VCR system. In the industry, the substitute of a cinema would be a home-electric-appliances and home
entertainment, which distributes recorded videotapes. In a broad sense, TV media and other entertainment, such as a video game, a musical theater and the major leagues, would be substitutes. The presence of good substitutes limits profits of the industry.

Distinct substitute of prescription drug industry, however, could not be identified. We expect that no significant substitute in the prescription drug market causes some excess profits to firms in the industry.

**Porter Force 3: Power of buyers**

There are some factors for strong power of buyers. The first factor to look at in determining buyer power is the number of buyers and the distribution of their purchases. The larger the number of buyers and the smaller their individual purchases, the less power each one will have.⁴

Second, standardization of products increases buyer power, since it typically reduces switching costs of those buyers and allows them to more easily play one supplier against a second.

Third, when buyers can integrate backwards, producing the goods for themselves, this increases their bargaining power. The more open are the transactions, the more power buyers have, in part because this reduces their costs of search among producers.

Historically in prescription drug industry, the buyer power of larger number but smaller pharmacies and hospitals has been weak. In addition, prescription drug market is highly fragmented so that the buying power of the industry is low.
However, prescription drug companies have faced increased pressure in the last decade from customers who are able to bypass the power network and generate their own electricity. **Appendix, Table 3: Top 30 Revenue Companies in Healthcare Industry** explains the emergence of huge buyers, which has made their buying network. These huge buyers began to threaten the profitability of the prescription drug companies.

![Graph showing growth rate of healthcare cost in US and Japan](image)

**Figure 3: Growth Rate of Healthcare Cost (in the U.S. and Japan)**

**Source:** Asahi Simbun, 29 Nov. 1999

The environment surrounding prescription drug industry is drastically changing. Because health care costs are increasing and occupies 14% of GNP in the United States and 7% of GNP in Japan in 1995 (**Figure 3: Growth Rate of Health Care Cost**), the buyers - governments or health maintenance organizations (HMOs) - are now putting pressure on for lower prices, particularly where patented bestsellers
are subjected to competition from out-of-patent generic drugs or “me-too” (similar to, but not identical with, the patented ones) compounds.\(^5\)

**Porter Force 4: Power of suppliers**

Prescription drug companies generally buy simple chemicals as raw materials. The suppliers of pharmaceutical company sell much cheaper products than the pharmaceuticals, which cost sometimes exceed hundreds dollars per milligram. The firm can choose the lowest price one from multiple suppliers, which means that drug companies have a bargaining situation.

**Porter Force 5: New entry**

The new entry barrier of pharmaceutical industry is extremely high. About fifteen years and a few billion dollars are necessary for developing a new prescription drug. It is difficult to predict that a new drug will be successfully launched or not. Even after being launched, it is not a rare case for a drug to be prohibited from the market place because of side effects.

As medical treatment is directly concerned in human health, more various regulations, restrictions and patents are existent than in other industries. These regulations are necessary to keep poor drugs off the market, and have been barriers to entry.\(^6\)

Regulations that hit products at particularly early stage are those that pertain to the pre-manufacturing screening of products. Like firms selling medical devices, pharmaceutical companies cannot market these products without prior
government approval. The most extensively analyzed pharmaceutical screening effort is that of pharmaceutical regulation by the Food and Drug Administration (FDA). Before a firm is permitted to market a pharmaceutical product, it must establish its safety and efficacy.

1) Prescription drug regulation totally strictly controls from R&D to advertisement. 2) In R&D process, high technology is required. 3) The sales network also is important for this industry. 4) The period of the prescription drug before patent expires, which means lifetime, is about twenty years. These particular environments make entrée barrier of this industry high.

1.2. An Outline of the Company

Prescription drug companies roughly consist of research and development, marketing, and manufacturing function. When three functions are in one body, the pharmaceutical company exhibits competitive power. For all functions, time is the most important factor, because company always competes with time before the patent expires.

1.2.1. Research and Development

Appendix, Figure 4: R&D in Pharmaceutical Industry shows typical research and development for prescription drug. The period of patent protection (normally twenty years) starts when the compound is registered with the patent office, not when it first appears on the pharmacist’s shelves (which can be as much as a decade later).
Thus, drug companies have a only a few years to recoup their research and development costs (including the cost of testing all compounds that did not make it to the end of the pipeline), and to earn profits for share holders, before their rivals are permitted to see how much of the market they can capture. For an average drug, every day of delay after a patent has been applied for costs $1 million in protected sales.7

Drug companies are fond of talking about their pipelines. This is the range of compounds they have been in various stages of their laboratories. The pipelines, however, are pretty leaky affairs. For every approved drug that comes out of pipeline, about 10,000 molecules have gone in and got lost somewhere on the way. A new drug needs roughly over 10 years to pass through the pipeline. (See Appendix, Table 4: Pipeline of Merck Research Laboratories) Pipeline is, so to speak, the root of a prescription drug company. We can read prescription drug companys’ 10 years hence, watching their pipelines.

The first four years of the pipeline is used for creation and pre-clinical test, which includes chemistry synthesis and animal efficacy and safety studies, such as bioavailability, pharmacokinetics and toxicology. Then, the prescription drug company brings only hopeful substances to the next clinical test stage.

1.2.2. Marketing and Sales

Prescription drug companies heavily promote their products. In the prescription drug industry, marketing is regarded important as well as R&D. The reasons are as follows:
A prescription drug is an experience good.

The demand for prescription drugs is close to unit elastic. (See Table 5: Economic Elasticity)

**Economic Elasticity** People want to use the best prescription drug regardless of price in comparison with other consumer goods. Still, once patients experience the particular drug, patients do not want to change the drug while they feel well. This concept holds true in not only epoch-making drugs, but also me-too drugs.

Table 5: Economic Elasticity

\[ Elasticity = -\frac{\% \Delta Qty}{\% \Delta Price} \]

- \( ED > 1 \), Demand is Elastic
- \( ED < 1 \), Demand is Inelastic
- \( ED = 1 \), Demand is Unit Elastic


Sunken cost is high, but marginal cost is low.

To find and develop one new drug requires now over $300 million, about 13 years, and 10,000 candidates, in average.\(^8\) However, if a prescription drug company can make an epoch-making drug, which no patient will willingly be fobbed off with a substitute, the pharmaceutical company can earn huge profits.\(^9\)

Battle before its patent expires.

For an average drug, there is only less than ten years before its patent expires. After launching a new pharmaceutical, the company still has to fight against time. The value of the average drug declines $1 million per day after a patent has been applied for, Time is the most important factor for the pharmaceutical company to succeed its
Sales. *(See Appendix, Figure 5: Dropping Sales of Zantac® after patent expiration in the US)*

Marketing and sales expenditures typically amount to 20 to 30 percent of revenue.\(^{10}\) The most heavily used form of promotion is to visit to physicians by the sales representatives, which is called as detailing. It occupies almost 70 percent of marketing expenditure of the pharmaceutical.\(^{11}\)

### 1.2.3. **Manufacturing and Delivering**

Strict quality control is more important than that of other industries. If contamination or poor quality is found in the particular lot, the company has to withdraw the entire lot, and lose millions of dollars.

Other threats of drug manufacturing are merchandise shortage. 1) The opportunity loss of prescription drug is huge and 2) it may seriously harm the patients who have to take it. The manufacturing division of the prescription drug company attentively makes production planning never to be in short supply.

Unlike most of other industries, the production cost of the prescription drugs is small in comparison to the price of final products. It is usually less than several percent of its revenue.\(^{12}\)
2. MCO and Prescription Drug Supply Chain

Managed Care is mediocre administrated or programmed by an organization instead of a physician in charge, and managed care organization (MCO) is health care organization or company, such as HMO, that provides medical services to its members through cost-saving managed healthcare practices.

In managed care, HMOs or other agents begin to manage medication. If physicians want to take expensive examination, take expensive medical treatment, or let admit their patients to a hospital, medical doctors have to get permission from them.

In 1980, 95 percent of US insurance holder contracted with indemnity plans, which pay a piece rate basis. Only 5 percent of others contracted with MCOs. In 1996, immunity plans remained at 14 percent. Most of the US citizens contract with MCOs, such as HMO, and Preferred Provider Organization (PPO). (See Appendix, Figure 6: Employees Enrolled in Health Plans: 1980 and 1995, and Table 5: Joining Rate for Healthcare Insurance the U.S.)

Health Maintenance Organization (HMO)

HMOs provide medical care to groups and individuals for a set monthly premium. They often attempt to provide care at lower costs than traditional fee-for-service insurance arrangements; in return, customers of the HMOs must accept less choice in treatment options and providers. HMOs essentially have guidelines for particular
diseases. Physicians, patients and pharmacies are controlled by HMOs. HMOs introduce contracted hospitals and pharmacies to patients. Therefore, hospitals and pharmacies, that patients are able to visit, are restricted.

HMOs account for more than three-fourths of the expenditures in health care.\textsuperscript{13} Controlling the billions of dollars in healthcare expenditures gave the HMOs considerable buying power in negotiating.

**Preferred Provider Organization (PPO)**

PPOs offer managed health care plans that contract with independent providers who provide services for plan members at discounted rates. PPOs offer the liberty of choosing clinics or hospitals more than HMO plans, instead of more expensive insurance payments.

**Emergent of Pharmaceutical Benefit Manager (PBM)**

Like HMOs, a PBM is a company that monitors and administers contents of prescriptions by medical doctor. Under the contract with PBM, patients who have prescriptions go to pharmacies designated by the PBM to get their prescription drugs. Patients pay allotments for the drugs. And then, the PBM pays the balance to the pharmacies.

PBM\textsuperscript{s} have a formulary, a list of designated pharmaceuticals, which influences pharmacies and hospitals. While PBM restricts the number of drugs, they list generic drugs and cheap “me-too” drug in their formulary to reduce costs. For example, when medical doctors use the particular pharmaceutical, except for one
designated by PBM, patients have to pay more for their medicine. In addition, according to circumstances, pharmacists or PBM calls medical doctors to recommend changing the prescribed drug, informing them of the existence of generic drugs or “me-too” drugs. This is called as counter detailing.

PBM get a profit not only to act for transaction of prescriptions, but also to dominate pharmaceutical companies and pharmacies. PBM get rebates from pharmaceutical companies, instead of listing the pharmaceutical company’s drugs in their formulary as approved drugs. If a drug of rival company replaces drug, the original share of drug will drastically decrease. Therefore, especially imitator drug companies cannot help paying rebate for the PBM to be listed their products on the PBM’s formulary. PBM also earns a commission from pharmacies, instead of collecting the patients and introducing them to the pharmacies, which is as same system as credit card.

The top five PBMs – PCS, Express Scripts, Caremark, Advanced Paradigm and Merck-Medco – covered 175 million people, or about 80 percent of the U.S. population having insurance coverage. Insurance providers paid about for 80 percent of the prescriptions. Many of the insurance plans, such as the Blue Cross Blue Shield Federal Employee Program (increasing more than 3.5 million people), had exclusive contacts with PBM.
2.1. Growth of the Managed Care

In the 1970s, when managed care began to make its presence known on the American health care scene, prescription drugs were rarely covered in standard benefit packages. Today, 98 percent of HMOs offer a prescription drug benefit (usually as part of the basic benefit package) and 92 percent of all HMOs enrollees are covered by a prescription benefit. In addition, 86 percent of HMOs are using drug formularies designed by PBMs. (See Appendix, Table 6: Formulary Facts) At present, many individuals who enroll in managed care plans feel entitled to drug coverage. Relationship between HMOs and PBMs is quite strong now.

This dramatic transition has occurred for two reasons. First, MCO administrators and payers understand that a well-designed and carefully managed drug benefit can:

- help reduce hospital admissions (and length of stay)
- slow or prevent the advance of certain disease states
- reduce the need for expensive, invasive procedures
- enhance quality of life
- help increase employee productivity.

Second, in the early years of managed care, a pharmacy benefit was a useful marketing tool, and the promotion of a drug benefit was an effective way to attract employers and new members. The competitive advantages of offering a drug benefit were short-lived, however, because after one MCO in a local market offered a drug
benefit, other MCOs typically followed, and the pharmacy-benefit advantage, in effect, disappeared.

2.2. Pharmacy Cost Surge and Controls

Most health care plans across the country experienced pharmacy cost increases in the 15 percent range during 1997, but many pharmacy directors were bracing for a year in 1998, anticipating increases of 20% or more if adequate controls were not implemented.\textsuperscript{17}

Harvard Pilgrim Healthcare, New England’s largest HMO, recently projected that prescription drugs will consume 22 percent of an average patient’s medical costs by 2002, while hospital expenses will be 20.8 percent. The investigation predicted that pharmacy costs would be second only to physician expenses in the Harvard Pilgrim Healthcare medical budget.\textsuperscript{18}

Managed care pharmacy budgets are receiving increased attention due to recent jumps in MCO drug spending. Actually, close attention to pharmacy is nothing new in managed care. Historically, the pharmacy budget has represented a relatively small percentage of the average MCO’s medical budget (until recently, less than 10 percent\textsuperscript{19}).

Most well-designed MCO pharmacy benefit plans include several components, such as the formularies and generic substitution drug utilization reviews. (See Appendix, Table 7: MCO pharmacy benefit plan’s cost-control tools)
2.2.1. **Product Limitations**

In addition to developing formulary policies, MCOs almost always limit coverage to certain types of products. For example, most plans do not cover:

- over-the-counter (OTC) products
- experimental (non-FDA approved) drugs
- drugs prescribed for "off-label" indications.

Drugs in certain therapeutic categories may also be excluded, including anti-obesity and smoking cessation products, fertility drugs, oral contraceptives, homeopathic agents, anti-impotence agents and some AIDS/HIV medications.\(^{20}\)

2.2.2. **Member Cost-sharing Arrangements**

Most MCOs require patients to pay out-of-pocket for a portion of their prescription drugs. The three most common cost-sharing arrangements are:

**Copayments**

A copayment, or copay, is a fixed dollar amount per prescription (usually $5 to $10), regardless of the retail cost of the drug. For example, on a $30 prescription with $5 copay, the member pays $5 and the pharmacy bills the MCO (or its PBM) for the balance. Some plans use variable or "tiered" copays that feature higher out-of-pocket costs for branded or non-formulary products and lower copays for generic or formulary products. Copayments are the most common form of cost-sharing for prescription drugs.
**Coinsurance**

Coinsurance is a percentage (e.g., 20 percent) of the retail cost of each drug dispensed. If coinsurance is 20 percent on a $100 prescription, the patient would pay $20; on a $20 prescription, the patient would pay $4.

**Deductibles**

A deductible is a dollar amount for prescription drugs (e.g., $150) that a member must pay before prescription drug coverage begins. For example, if the deductible is $150, a member might need to pay out of pocket for five $30 prescriptions - or one $150 prescription - before coverage kicks in on the member's next visit to the pharmacist.

Cost-sharing is also a form of cost control because it discourages members from indiscriminately using the pharmacy benefit. Prescription drug companies are strongly influenced in PBM’s pressure of reducing use of prescription drug.

**2.3. Medicare and Medicaid**

Medicare and Medicaid are the medical care program for aged people and for needy people, respectively, in the United States. Medicare and Medicaid are under the direction of the United States Department of Health and Human Services.

Medicare is the federal health insurance program for people 65 years of age and over. The program, which went into effect in 1966, was first administered by the Social Security Administration. In 1977, the Medicare program was transferred to
the newly created Health Care Financing Administration (HCFA). Beginning in July 1973, Medicare was extended to people under the age of 65, with certain disabling conditions. About 36 million people were enrolled in Medicare each month in 1995, and its monthly premium stood at $43.80 a month in 1997.21

Medicaid is a federal-state program. It is usually operated by state welfare or health departments, within the guidelines issued by the HCFA. Medicaid furnishes at least five basic services to needy people: inpatient hospital care, outpatient hospital care, physicians' services, skilled nursing-home services for adults and laboratory and X-ray services. The people who are eligible include families and certain children who qualify for public assistance and may include aged, blind, and disabled adults who are eligible for the Supplemental Security Income program of the Social Security Administration. States may also include people and families termed "medically needy" who meet eligibility requirements except, those for financial assistance. Each state decides who is eligible for Medicaid benefits and what services shall be included. Some of the benefits frequently provided are dental care, ambulance services, and drugs, eyeglasses, and hearing aids. In determining eligibility for the program, a state may not hold adult children responsible for medical expenses of their parents. In 1994 over 31 million people received Medicaid health care support.22
3. Direct to Consumer Marketing Channel

In chapters 2 and 3, I explained the nature and function of pharmaceutical industry, and the new environment surrounding them, such as the Internet and MCOs. In this chapter, I explore further marketing function.

The marketing activity of the prescription drug company is heavily regulated by the regulatory authorities. Therefore, though the marketing cost of the prescription drug company is huge, it has not been recognized by common people. The paper analyzes the prescription drug marketing strategy.

3.1. The Value Chain of Prescription Drug Industry

The value chain\textsuperscript{23} of pharmaceutical industry is so complicated that whole value chain of prescription drug industry, unlike other industries which have simple substance flow, could not be explained with linear chart. Appendix, Figure 7: The Value Chain of Prescription Drug Industry would help us understand whole value chain of prescription drug industry.

The figure shows three flows of whole industry: information, real substance (the prescription drug supply chain) and contract. These flows play different parts in prescription drug value chain. The figure also distinguishes different generations: the light blue rectangles mean the original member of the value chain and the purple ones mean the new member of the value chain.
Biotechnology company and Contact-Research Organization (CRO)

In addition to the companies previously mentioned in the chapter 3, biotechnology companies (bio ventures) and contact-research organizations (CROs) began to play important roles in the value chain.

Biotechnology companies, such as Amgen, Genentech, Chiron and Genzyme, appeared in the 1980s. These companies worked out ways of finding new drugs without screening libraries, and by picking proteins whose functions were already known as their lead molecules. Knowing what a protein does in the body is no guarantee that it can be turned into a useful drug, but it is a start. The success of these companies was based on a technology. Biotechnology companies sell their intellectual property to the prescription drug companies.

CROs help prescription drug company's outsourcing. CROs execute the last part of research and development process of prescription drug companies. They show whether the substance being tested is likely to be safe and effective. Running such trials and also the pre-clinical trials that lead up to them are main business of CROs.

This paper focuses on marketing part of prescription company. It is interesting to analyze the performances of biotechnology companies and CROs further, but this is beyond the scope of this paper.

3.2. Direct-to-consumer Marketing Channel

Prescription drug companies want to advertise their products, for direct-to-consumers (DTC), because patients tend to pay attention their health and medical
treatment. Like other products, the purpose of DTC is establishing brand for patients. Not all, but some categories of prescription drugs seem to be good targets for branding.

DTC roles supplement the function of physicians, but the importance is increasing. Effect analysis of the DTC advertisement is progressing. This paper surveys the effective use of DTC advertising. DTC advertising surely will increase if marketing surveys confirm that it leads to greater sales and profits for drug companies.

3.2.1. FDA Regulations Allowing Prescription Drug Companies to Advertise More Freely

In the past, disseminating information about prescription drugs was left mainly to physicians. It was unheard of for drug manufacturers to advertise a prescription drug directly to potential patients, under the FDA’s understanding of “prescription drugs be shown to be safe and effective before marketing.”

Prescription drug companies expanded their DTC advertisement budget from $55 million in 1991 to $516 million in 1996, but at that period, the companies could not appeal consumers their product’s name. They could only promote their corporate name under FDA’s deregulation policy.

The FDA showed the provisional new guidance of prescription drug advertisement for DTC in August 1997. The change of attitude by FDA allowed companies to use DTC in the US. The guidance stimulated DTC advertisement
though media. Consumers can watch the TV advertisement such as "You don’t feel sleepy from this allergy drug, effect continues for 24 hours with only one tablet!"

**Guideline for industry consumer-directed broadcast advertisements**

The prescription drug advertising regulations (21 CFR 202.1) distinguishes between print and broadcast advertisements. Print advertisements must include the brief summary, which generally contains each of the risks from the product’s approved package labeling. Advertisements broadcast through media such as television, radio, or telephone communication systems must disclose the product’s major risks in either the audio or audio and visual parts of the presentation. This is sometimes called the *major statement*.

The FDA revised its provisional guidance in 1999, but essentially did not change the basic contents. The Federal Food, Drug, and Cosmetic Act requires advertisers who advertise prescription drugs to disclose a summary of potential adverse event and taboo as well as efficacy.25

Prescription drug companies now can put advertisement on the toll free numbers, magazines, the websites, and TV commercials, but these direct advertisements of prescription drugs are still regulated by FDA. On the other hand, OTC drugs are regulated by Federal Trade Commission, and the level of the regulation is more lenient.

Prescription drug companies should inform consumers about the details of the product, accurately. They should inform them not only about the benefits but also
about the risks. Unlike OTCs drugs, competitive advertisement of prescription drug is not allowed by the government.

Because over promoted contents are included in the advertisements, the deregulation had been discussed how prescription drug should be advertised to customers. For the people who do not have a medical education, in fact, it is very difficult to understand the real difference in pharmaceuticals. At least, well understanding of consumers is important point.

Marketing in Europe and Japan is hampered, in comparison with the more liberal US market, by EU and Japanese regulations that prohibit the promotion to patients of prescription drugs.

3.2.2. Attitudes and Opinions of DTC
Response is split over of DTC advertisement, depending on the people's position.

Consumers
Most consumers feel positive to neutral about DTC. DTC allows consumers to become more involved in their self-care. The trend in self-care is growing with educated aging baby boomers and a continued lack of trust in MCOs. DTC helps educate people about the risks and benefits of prescription drugs. DTC increases patient compliance and refills. DTC helps build brand loyalty and safety perception of drugs.
On the other hand, consumers complain that DTC advertisements are not always clear to them. DTC advertisements are not doing a good job supplying risk information.\textsuperscript{27}

**Physicians**

There are medical doctors' voices, which request FDA approves of much free advertisement policy. Physicians say that advertisements on the TV or radio are adequate to substitute a toll-free phone number, an Internet address or referral to a printed advertisement, or to a physician or pharmacist.

Lead deputy commissioner, Michael J. Friedman, M.D., was quoted as follows: "Today's action can help promote greater consumer awareness about prescription drugs. By describing realistic standards for television advertising of prescription drugs, we hope to end the uncertainty, which has plagued both consumers and industry about the use of this medium. The FDA is committed to making sure that accurate and complete information is available to consumers."\textsuperscript{28}

The example above, however, is a minority opinion as a whole. Most of the physicians' attitudes about DTC are neutral but some are even negative.\textsuperscript{29} Physicians experienced drastic change of medical treatment after the first MCO came in the medical market. While some of medical doctors expect a future threatened by a perceived loss of control with manufacturer's DTC, most physicians respond favorably to consumer requests for specific drugs. The key is to have sales representative present, discuss and justify DTC activities with physicians.
MCOs

MCOs are generally negative to DTC. MCOs feel that knowledge which DTC creates consumer pull and then raises their costs for both expensive and unnecessary drugs. MCOs also feel a loss of control over doctors, their core competence. Therefore, MCOs would like advance notice before rolling out a DTC campaign.

On the other hand, it is also true that MCOs intend to be part of process of DTC development before they will be beaten.

FDA

FDA guidelines changed in August 1997 to allow broadcasts without brief summery. FDA's policy is that it approves of advertisement and makes patients pay attention to their health more freely.

Pre-clearance of advertisement is not mandatory, but it is the industry norm. FDA, however, continues to study effects of DTC advertising:

- Is DTC positively effecting the doctor-patient relationship?
- Is there comparably of presentation risk versus benefit information?
- Is there proper communication of indications and efficacy?
- Should DTC advertising for antibiotics be allowed?

FDA is also anxious about the use of DTC, but is not expected to make any major changes in the near future.
3.2.3. Branding of Prescription Drugs

Brand equity is highly related to how many customers value the brand and see it as a friend. It is also related to the degree of brand name recognition, perceived brand equity, strong mental and emotional associations, and other assets such as patents trademarks and channel relationships. Can prescription drug industry hold high brand equity?

Tylenol® is a famous OTC drug, which succeeded in establishing branding, with developing highly reliable brand name. As prescription drugs had been prohibited to advertise for common people, there is no long-term marketing investigation. However prescription drug companies are driven by necessity to find the most effective way of advertising.

Brand-name decision

Manufactures and service companies who brand their products must choose which brand names to use. Fore strategies are available:

- Individual names:

  This policy is followed by prescription drug’s name (Clalitin®, Propecia®, Prevacid®, and so on). A major advantage of an individual –names strategy is that the company does not tie its reputation to the product’s. If the product fails or appears to have low quality, the comp or image is not hurt.

- Blanket family names:

  This policy is followed by Merck and Pfizer. A blanket family name also has
advantages. Development cost is less because there is no need for "name" research or heavy advertising expenditures to create brand-name recognition. Furthermore, sales of the new product are likely to be strong if the manufacturer's name is good.

- Company trade name combined with individual product names:

  This policy is followed by Bayer Aspirin. Some manufacturers tie their company name to an individual brand name for each product.

  Before deregulation of DTC, prescription drug company could not develop their "individual names" of drug because they cannot call "products name" for patients. In this era, prescription drug company can establish only "blanket family names".

  Today, prescription drug companies prefer "individual names" for their branding. The first reason is that the prescription drug potentially holds uncertainty of the drug's sales. In chapter 1, this paper mentions the difficulty of predicting particular prescription drug's success and withdrawal. Unfortunately, if the drug causes serious side effects, the regulatory authority will forbid its sales, and it is not a particular affair for prescription drug industry.

  Second, prescription drug companies sometimes have multiple alliances for each product (See Appendix, Figure 8: Multiple Alliances). As a result, a few prescription drug manufacturers simultaneously sell the same prescription drug. Therefore, establishing individual name as a brand is more important than that of blanket family name.
Finally, getting new patient realizes with medical doctors’ prescription. At that time, physicians have to write individual drug name, but drug company name. Therefore, “reminder” of the individual drug name is very important.

Today many prescription drug companies hire a marketing research firm to develop and test names. These companies use brainstorming sessions and vast computer databases, catalogued by association, sounds and other qualities. Name-research procedures include 1) association tests (What images come to mind?), 2) learning tests (How easily is the name pronounced?), 3) memory tests (How well is the name remembered?) and 4) preference tests (Which names are preferred?). For prescription drug company, “individual names” for easily remembrance is crucial to acquire new prescriptions.

3.2.3.1. When does DTC advertising work best?

DTC is expected to help build brand loyalty and the safe use of perception drugs. Because the cost of prescription drug is expensive, prescription drug companies have to pick up the target for maximizing the advertising effect. It is important to evaluate the effect of DTC advertising with marketing theory.

Market size

Companies should advertise for its major products. The prices of the prescriptions are quite varied. They are from few cents to several hundred dollars. In order to expand profit, the advertised products are limited. The target should be in growing markets.
Competitors

It is desirable that there are only few competitors to differentiate from other products clearly. If there are too many competitors, differentiating products is difficult. On the other hand, if there is no competitor, advertisement should focus on expanding the market. An occasion when new competitors are expected to enter the market is an appropriate time to have a DTC advertisement.

Types of disease

At first, the drug for the disease easily understood by patients would be good target for DTC advertisement. If the subjective symptoms are clear for the patients, they pay attention their diseases. Second, drug therapy to provide relief for acute symptoms could be ideal, because the needs of the drug is extremely high at that time, and they certainly purchase the most reliable drug. Third, the disease that has recurrent symptom, such as pollen allergy and gastroesophageal reflux disease (GERD), is good target, because patients who experience the effect of the drug recurrently purchase the same drug.

Real advantage

When the products has real advantages that are not yet widely known, the DTC advertisement would be effective. For example, if the drug’s exclusive character is “taking once a day,” its advertisement would be effective.
3.2.4. **Media of DTC Advertisement**

Appendix, Figure 9: Change in the Prescription Drug Marketing explains traditional information flow (blue and black arrows) and new trend after the deregulation (red arrow). With deregulation, prescription drug companies began to put a DTC advertisement.

Consumers stimulated by the company's advertisement are increasingly becoming more aware of their options when it come to prescription drugs. Medications such as Rogaine®, Claritin® and Viagra® are household names due, in part, to new style marketing campaign – direct to consumer advertising. MedAd News reported that $775.9 million was spent on direct-to-consumer advertisements in the first six month of 1999. In comparison, for the first six months of 1998, $572.7 million was spent, a 35.6 percent increases. (*See Appendix, Table 8: Total Expenditure of Prescription Medicines Advertised to Consumers*)

3.2.4.1. **TV-commercial**

Of the total amount spent in the first half of 1999, $236.1 million on network television advertisements, $105.7 million on cable television ads, $45.2 million on spot TV ads, and $32.7 million on syndicated TV ads. 

In 1998, TV-commercial spending exceeded document-based advertisement because of DTC deregulation. (*See Appendix, Figure 10: DTC Investment Trends 1994-1998*) It is clear that broadcast media give large impact to audience. Hereafter, this trend seems to continue with increasing competitive environment.
3.2.4.2. Newspaper and Magazine Advertisement for DTC

Newspaper and magazine advertising for DTC should be separated from that for medical specialist. While the magazine advertisement for medical specialist has a long history, the prescription drug companies could develop advertisement only about corporate identity advertisements, or general information about diseases for the prospective patients to appeal indirectly the necessity of pharmaceutical treatment.

The present shape of newspaper and magazine advertising for final consumer was approved in 1997, when DTC was deregulated as well as TV advertisement. (This paper mentions an advertisement of medical specialist in the chapter 5.) After the deregulation, sponsors of broadcast advertisements are required to present a brief summery that may make "adequate provision for dissemination of the approved or permitted package labeling in connection with the broadcast presentation" by FDA. Therefore, newspaper and magazine advertising accompanies with accompanying documents called as "circulation".

Appendix, Figure 11: Source of Advertisement Expenditure shows the 25 percent of total advertisement expenditure for consumers is used for magazines and newspapers. However, the 25 percent of expenditure could be considered as the required incidental expenses of broadcast advertising, which occupies about 60 percent of total advertisement expenditure for consumers (network and cable TV, radio). Also, magazine and newspaper advertisements sometimes accompany rebate
coupon. *(See Rebate, below)* The newspaper and magazine advertisement are indispensable to DTC, although they are the side roles.

### 3.2.4.3. Rebate

As with other industries, such as personal computers and food companies, prescription drug companies provide a price reduction after purchase rather than at the drug store. Consumer send a specified “proof of purchase” to the manufacturer who “refunds” part of the purchase price by mail. The redemption rate is around $5 to $10 per a new prescription.

Rebate coupons inserted in magazine and newspaper ads or distributed by sales representatives (attached to samples, or placed in the clinics), are used as a marketing tool of pharmaceutical companies. *(See Appendix, Figure 12: Rebate Coupon)*

The rebate coupon encourages patients to talk health care professionals about the particular products. For example, a rebate says, “Talk to your doctor or health care professional to see whether Nasorex® is right for you.” This phrase looks intimation of demand on new prescription. After the patient purchases Nasorex® and sends a prescription drug company the receipt and rebate coupon, they can receive a $5 cash refund.

A rebate can be effective in stimulating the sales of early trial of a new brand, and a stronger marketing tool than TV and Internet advertisement, with regard to acquiring patients directly. The rebate would effectively work when a customer has no insurance or the particular brand prescription drug is on the insurer's formulary.
because the self burden of the drug would exceed the rebate amount. Otherwise, the rebate is effective for competition inside the same formularies.

Pharmaceutical companies uses this incentive as a marketing tool with enough lower cost than its price. Prescription drug companies rather should not set a large rebate redemption rate. Patients who have medical programs will receive redemption from both insurers, such as an HMO and a government, and prescription drug companies.

While a rebate is effective with relatively cheaper cost, prescription drug companies have to be careful in its use. Both MCOs and physicians are negative about DTC. MCOs feel that incentive that DTCs create consumer pull and then raises their costs for both expensive and unnecessary drugs. Physicians also lose control to meet patients' demand.

The rebate should not be unreasonably large amount to supply the incentive for patients. It would well work when there are many similar drugs, and patients are familiar with the effect of the drug.

3.2.4.4. Internet Advertising

In spite of lightning pace of developments in cyberspace, some companies are only tracking their Internet strategy in any depth. Most companies already have a plethora of websites promoting their corporate brand and their medicines, but they have been slow to absorb the broader implications of the technology.

The Internet could radically change the relationship between drug companies and their customers (both patients and physicians) as well as both doctors and
health insurers. The advent of e-pharmacies and business-to-business (B2B) sites could also change the dynamics of the supply chain, making it more difficult for pharmaceutical companies to control prices in different markets.37 Many PBMs also watch for establish more effective cost-control system with IT technology, which would expose prescription drug companies to danger. In the same way, no one quite knows what the impact of the Internet will be, but drug companies ignore its influence at their peril.

Pharmaceutical companies actively make website, which has contents of products information for both physicians and patients in the U.S. disease explanation, as well as company’s profile. The website provides supplementary material of a catalog or accompanying documents of the drug. (See Appendix, Figure 13: Website (Actoe® : Takeda Pharmaceuticals America, Inc.))

There is also possibility of reducing marketing and sales cost, but it is highly doubtful that traditional person-based sales will fully change to web-based sales activity.
4. Physician-based Marketing Channel

In the U.S. annually, in 1998, about $6.1 billion dollar was used for indirect consumer marketing advertisement (physician-based promotion). On the other hand, only about $1.2 billion was used for direct consumer advertisement. (See Appendix, Figure 14: Trends in Prescription Drug Promotion)

Because of the DTC boom, DTC advertisement spending continues expanding from $0.2 billion in 1994 to $1.2 billion in 1998, but the dramatic increase in DTC advertising has not been at the expense of physician-based promotion. Pharmaceutical companies know how to use many kinds of advertisement properly. The way of their advertisement consist of physician-based marketing method and DTC method, and proper combination of both are crucial.

4.1. In-personal Detailing

Promotion by sales representative, which is called detailing, has been the main sales technique of the prescription drug industry; in fact, almost 70 percent of pharmaceutical industry marketing expenditures are spent on this type of personal promotion.

According to Columbia University's report about the roll of sales representative in the prescription drug industry in the 1950s, almost all sales representatives can meet physicians without appointment, and only 10 percent of
physicians reported that meeting with sales representative is useless.\textsuperscript{38} For very busy physicians, sales representatives are the people who offer practical knowledge. Sales representatives speak about practical issue in the use of drugs. They know the name of drugs, how to take a medicine in special case, such with aged person and children, and answer questions from physicians immediately. Sales representatives want to speak about new products, trends of industry and medical technology. In addition, sales representatives frequently come by themselves, and physicians do not have to much effort.

\textbf{The role of sales representatives}

Not only promoting their products, sales representatives play other roles in following information for physicians to use the prescription drugs effectively:

\begin{itemize}
  \item how to use drugs effectively
  \item how to avoid side effects
  \item particular case
  \item urgent report.
\end{itemize}

Sales representatives serve as a consultant to physicians. With additional information by the sales representatives, they are able to use the prescription with confidence. Therefore, sales representatives are important marketing channels.

Normally meeting time per visit is from 5 to 15 minutes, and frequent meeting to physicians is important factor of the sales increasing. According to
Answers & Insight Inc.'s research, there is positive correlation between the sales result and the number of sales representative's visiting, until twelve times per year. 

(See Appendix, Figure 15: The Number of Visiting and Sales Result) Especially, sales amount is increasing until six times visit per year, but sales amount is still increasing over seven times visit per year. In this survey, physicians, who have a contact with sales representatives uses more particular products of the prescription drug company in which the sales representatives works.

Prescription drug companies have experienced that goodwill and sales result are related each other. See Appendix, Figure 16: Relationship - Corporate Impression and Frequent Visiting shows that the relationship between the number of visit and goodwill of the physician. According to this survey, the number of visit and goodwill of the physician also have positive correlation, which is similar to the Figure 12. i.e. the undesirable attitude of medical doctors, who are visited less than 0.5 times visit per month, changes desirable with more frequent visit of sales representative.

Argument of in-personal detailing

Comanor (1986) observes that the hypothesis of wasteful or jamming advertising is insufficiently formalized, and that evidence on its behalf is largely impressionistic, relying on comments, letters and editorials of a self-appointed group of physicians and health professionals.

Indeed, other scholars have claimed that drug advertising performs an eminently informative function. Peltzman (1975) proposes that advertising helps to
achieve an efficient rate of diffusion - where the benefit from increasing the rate just pays the costs required to do so. He strongly objects to the further imposition of regulatory restraints on drug promotion, but he does not present econometric evidence to buttress his argument.

4.2. Consumer Buying Model of Prescription Drug

How do physicians decide one prescription drug from a many of candidates? Cotler's "five-stage model of the consumer buying process" provide sensible hints. The consumer passes through five stages: problem recognition, information search, evaluation of alternatives, purchase decision and post-purchase behavior. Clearly, the buying process starts long before actual purchase and has consequences long afterwards. The Five-Stage Model of the Consumer Buying Process in Figure 17 implies that consumers pass sequentially through all five stages in buying a product.

At this level, a person simply becomes more receptive to information about a product. At the next level, the person may enter active information search: looking for read material, talking friends, and

Figure 17: Five-Stage Model of the Consumer Buying Process

visiting stores to learn about the product. Of key interest to the marketer are the major information sources to which the consumer will turn and the relative influence each will have on the subsequent purchase decision. Consumer information sources fall into four groups:

• personal sources, e.g. family, friends, neighbors and acquaintances

• commercial sources, e.g. advertising, salespersons, dealers, packaging and displays

• public sources, e.g. mass media and consumer-rating organizations

• experiential sources, e.g. handling, examining and using the product

The relative amount and influence of these information sources vary with the category and the buyer's characteristics. Generally speaking, the consumer receives the most information about a product from commercial sources i.e., market-dominated sources. But the most effective information comes from personal sources. Each information source performs a different function in influencing the buying decision. Commercial information normally performs an informing function, and personal sources perform a legitimizing or evaluation function. For example, physicians often learn of new drugs from commercial sources, but turn to other doctors for evaluation information.

Through gathering information, the consumer learns about competing brands and their features. The first box in Figure X shows the total set of brands available to the consumer. The individual consumer will come to know only a subset of these
brands (awareness set). Some brands will meet initial buying criteria (consideration set). As the person gathers more information, only a few will remain as strong contenders (choice set). The brands in the choice set might all be acceptable. The person makes a final from this set.

Appendix, Figure 18: Successive Sets Involved in Consumer Decision Making makes it clear that a company must strategize to get its brand into the prospect’s awareness set, consideration set and choice set. The company must also be aware of the other brands in the consumer's choice set so that it can plan competitive appeals. In addition, the company should identify the consumer's information sources and evaluate their relative importance. Consumers should be asked how they first heard about brand, what information come in later, and the relative importance of the different information sources. The answers will aid the company in preparing effective communications for the target market.

4.3. Product Sample

A sample is only once distributed to each patient from a week to a month. Pharmaceutical companies offer samples under the pretext of helping new patients to evaluate new medicine. Samples are distributed to the clinics and hospitals and then given to patients after diagnosis. Normally, at the same time, the prescription of same drug is given to patients, which means that pharmaceutical company got new patients.
Sample works with detailing activity of sales representative. In chapter 1, this paper mentioned that prescription drug is experience goods. If a patient take a medicine, he or she does not want to change the medicine. Samples, which reduces transaction costs, offer patients incentives to take or change the drug.

4.4. Medical Journal Advertisement

It is not so difficult to assess in-personal sales activity. The marketing manager of the prescription drug company can easily track each sales representative’s activity. On the other hand, evaluating medical journal advertisement is extremely difficult.

According to PERQ/HCI report in 1999,\textsuperscript{39} 76.3 percent of physicians answered that medical journals were important source of medical information to them, and they revealed that 66.5 percent of them were exposed to information or advertising on products that were printed on medical journals. This survey revealed that physicians read journals, and saw advertisements of prescription drugs.

However, there is still question about its effectiveness because seeing advertisement does not always lead to satisfactory results. In the last chapter, this paper explores the role of medical journal advertisement as a marketing tool.

4.5. Exhibition on Academic Meeting

The Takeda Abbott Pharmaceutical, Inc. (TAP) holds academic meetings 12–13 times per year.\textsuperscript{40} The academic meeting offers the latest academic data to medical
specialists. This plan is sometimes held accompanying with regular medical conference, such as national hypertension meeting.

The advantage of this meeting is that prescription drug companies can exhibit recent data about their drugs to many physicians who are in the forefront of the medical world, at the same time. Also, as the meeting takes place in luxurious environment, it would make trust or positive feeling to participant. It, however, is unclear for this marketing activity directory tying up its sales result, in spite of large amount of budget per participant.
5. Marketing Activity to MCOs

The prescription drug companies have independent sales representatives taking charge of HMOs and Government.

"Takeda Abbott Pharmaceutical, Inc. (TAP) selling the anti-ulcer drug Prevacid® and prostate cancer drug Lupron® has 1,500 sales representatives taking charge of clinics and hospitals, and separately has about 40 HMO/PBM account executives and 10 State/Government affairs representatives playing active parts in marketing for HMO and Government" said Takashi Kanda, Senior Vice President of TAP said.41

The responsibility of HMO/PBM account executives and state/government affairs representatives are negotiating with corporate officials to adopt their prescription drugs in their formularies. It is necessary to consider the profit of HMO/PBM and state/government profit to get success.

5.1. Consideration of MCO Business Objectives

MCOs have three basic business objectives:

- Earn a profit

MCOs, like other business ventures, must ensure that income exceeds expenses. Because MCOs are cost-driven, they focus on managing costs.

- Increase market share
Increasing market share provides increased revenue for MCOs. One way to help manage costs is to enhance a plan's market share. Plans try to increase market share among employers, among total covered lives, and, in some cases, among the Medicare and Medicaid sub-markets.\(^{42}\)

- **Provide quality care**

To be successful, an MCO needs to maintain a reputation for quality in its service area. MCOs strive to demonstrate quality by achieving high scores in Health Employer Data and Information Set (HEDIS) ratings,\(^{43}\) on internal report cards, and in the newspaper and magazine articles, such as the US News HMO ranking.

### 5.2. Activities by HMO/PBM Account Executives for Adoption on the Formulary

As a personal task, account executives should recognize, “who is the key decision-maker,” and “what are the important business strategies of the particular MCOs in which the prescription drug company’s account executives takes responsibility.” Marketing activity could be categorized to three parts as follows:

**Price strategy**

Low price is the primary competitive weapon of this strategy. Prescription drug companies sign contracts for each HMO. The discount is strong tool, but the difference of discount rate for each MCO reaches more than three times.\(^{44}\) However,
such a policy not only loses profitability, but also is inconsistent with a prospector strategy and a differentiation strategy.

**Originality strategy (non-price strategy)**

A blockbuster product realizes high prices without losing competitiveness and carry benefit. Because MCOs intend to establish a general reputation for their quality, they cannot remove epoch-making prescription drug from their formulary. Differentiated epoch-making products seldom adhere to a policy of low competitive prices.

**Differentiation strategy (non-price strategy)**

Similarly, differentiation also provides customers with additional value for which higher price can be charged. Once a prescription drug experiences a prominent outcome in clinical treatment, it may captures many customers. The data of cost-benefit analysis has more persuasive power because it may bring economic profit for MCOs.

**5.3. Cost-benefit Analysis**

In an influential early article, Williams (1974) used the phrase the “cost-benefit approach” as a generic description of the way of thinking that economics brings to health care evaluation, where the problem is framed in terms of a production relationship between resource inputs and health outputs.⁴⁵
The feature that distinguishes among techniques of economic evaluation is the way in which the consequences of health care programs are valued. Cost-benefit analysis (CBA) offers program consequences to be valued in monetary units.

CBA reveals how consequences of health care programs can be valued in terms of money. CBA compares the discounted future streams of incremental program benefits with incremental program costs, the difference between these two streams being the net social benefit of the program. (See Appendix, Table 9: Cost-benefit Analysis) The goal of analysis is to identify whether a program's benefits exceed its costs.

Osamu Isoyama, General Manager - Pharmaceutical Marketing Division of Takeda Chemical Industries Ltd. says, "Prevacid® was certified with CBA data that it could cure duodenal ulcer less expensively than conventional histamine 2 receptor antagonist, which makes its sales skyrocketed."

Both MCOs and prescription drug companies pay attention to CBA. MCOs aim to maximize their medical program in terms of effect per cost. Thus, more cost-beneficial drug, which is certified by cost-benefit study, shows strong persuasive power.

5.4. Alliance and Acquisition with MCO

The recent rush for pharmaceutical firms to make alliances with, or to acquire, pharmaceutical distributors is an example of investment in expert, reward and legitimate power. Merck's acquisition of Medco, a new type of distributor in the PBM
business, in 1993 for $6.6 billion is a good example.\textsuperscript{46} (After acquisition, Medco was renamed Merck-Medco)

Merck-Medco claims to handle the prescriptions of 38 million people\textsuperscript{47} in the United States under assorted managed care arrangements. The expert power of distributors like Merck-Medco arises from the database they maintain connecting prescriptions to physicians, patients, payers and managed care companies; their ability to discount heavily; their contracts to fill prescriptions under many company health plans; and their maintenance of formularies.

Not only has Merck made this type of investment in expert power in the pharmaceutical distribution channel, so too has SmithKline Beecham, which bought Diversified Pharmaceutical Services and McKesson, whose subsidiary, PCS, is also in the PBM business. It is estimated that more than half of all Americans buy prescription drugs through PBMs.\textsuperscript{48}

Alliances with MCOs realizes not only to avoid unnecessary conflict, but also to get prescription data, which could effectively influenced marketing strategy. However, public opinion feels anxious that an HMO may distort their optimum health care program with pressure from the parent company that acquired an HMO.\textsuperscript{49} It hardly needs saying, prescription drug companies should pay attention to public opinion.
6. Future of the Prescription Drug Business and the Internet

The prescription drug industry has long enjoyed the comfort of market shielded from pressures that influence pricing in other sectors. In 1996, the prescription drug industry, with an average profit margin of the ten largest drug firms was 30%, has been one of the most profitable industries. Until recently, physicians prescribed drugs without any constraint on use and without regard for cost. Payers, private and public, paid without examining the sequential margins extracted by manufactures, wholesalers, distributors, and pharmacists.

With web-site, airlines and automobile companies are beginning to sell their products by themselves. Health care has remained remarkably isolated from the harsh economic forces that have driven productivity and competitiveness in other sectors. Health care is squarely in the sights of new business entrants, who seek the financial rewards, using the Internet.

The isolated-situation for the industry will be over. In the US, healthcare business on the Internet is becoming substantial, permeating every element of the health care value chain, including:

- Business-to-business (B2B) exchanges for medical products including prescription drugs and equipment

- Automated process of insurance claims; community site for physicians
• New networks for secure sharing of medical records and laboratory tests

• A renaissance of net-based tele-medicine for imaging and other services.

New Internet-based transaction may influence current value chain intermediaries such as wholesalers and pharmacies, and make the prescription drug industry less profitable.

Also, many MCOs are more threatening to the prescription drug industry with efficient operation of IT and the Internet. HMOs join hands with PBMs which offer drug formularies. There are more than a hundred HMOs, and the useable prescription drugs are various, depending on particular HMOs, and physicians are confused the selection of pharmaceuticals. IT and the Internet technology would solve this problem. Physicians simply input the name of an HMO and question (or simply name of disease), and then a computer displays the available prescription drugs. HMOs can operate their business more securely with IT and the Internet.

While the Internet accelerates the trend, the prescription drug industry should pay more attention to it.

6.1. Online Pharmacy

Online pharmacies in the U.S. are rapidly growing. Drugstore.com was established on August 24, 1998, and has grown from 12 to more than 300 employees, including more than 40 licensed pharmacists in fewer than 12 months. During first six months of its existence, more than 160,000 customers had come to shop. For the six months
ending July 4, 1999, drugstore.com sold products to approximately 168,000 customers, with net sales of $4.2 million.²²

An online pharmacy enables customers to avoid customers waiting in line. Customers ordering online can also know instantly what alternatives are to the product that is currently on order and not in supply.

Not only customers, but also it carries benefit to retailers. First, prescription drug store can exploit economy of scale (and scope), while 3,000 products are in a common physical store, online store, “drugstore.com” stocks 17,000 products. Second, an online system can administer inventories timely and efficiently. Third, items of online drug store are lightweight and expensive per unit so that items are suitable for deliver. Finally, fulfilling prescription drug business is most fascinating business in terms of IT technology’s added value which an automatic facility to remind patients when an item is running low and must be ordered.

6.1.1. FDA Regulation of Pharmacy

However, the legislative and regulatory framework is complex. In the U.S., as well as many countries, regulations prohibit selling patients prescription drugs without prescriptions. This is important factor to influence sales growth. Currently in order to purchase prescription drug, a customer has to:

- send her/him real prescription to a pharmacy
- ask doctor her/himself to call a pharmacist
Each process is disadvantageous for the online drug store. In spite of finishing order, because of not finishing submitting real prescription, patients have to wait about two months. Asking doctor is also difficult. Doctors basically have their waiting patients. Calling to drugstore.com seems to require about three or more minutes. Patients seem to hesitate to ask doctors, and doctors also seems to recommend other physical drug stores to patients.

6.1.2. Future of Online Drugstore

The U.S. Association of Boards of Pharmacies has established a voluntary certification process to accredit e-pharmacies. The Internet will increase the ability of informed individuals to order medicines already prescribed to obtain the best price, and to save time.

Like other e-commerce, experience of first ordering and purchasing are important incentives for customers. More important characteristic of prescription drug is this item ordered frequently. Therefore, if layer of customer expands, the sales of prescription drug seems to be expanded with increasing speed. If government deregulate inspecting prescription and elderly patients more familiar with PC operation, online drugstores will drastically expand, and the huge buyer power will suffer physical drug stores, wholesalers, and prescription drug companies.

Expanding online pharmacies means increasing buying power of prescription drug companies. In chapter 1, this paper noted that the buyer power of larger number but smaller buyers (pharmacies) in the industry had been weak. Because
future small number, but huge online pharmacies make opposite situation, the power of buyer will increase. And then prescription drug companies should restructure their businesses to prepare for the circumstances.

The sale of pharmaceuticals via the Internet may pose a serious threat to margins. Transparency in the pricing of pharmaceuticals posted on e.pharmacy websites may drive purchases to demand ever-lower prices. Pharmaceutical companies will need to offset these margin pressures by lowering transaction costs by adoption of an e.supply chain and dis-intermediation of wholesalers and pharmacists, together with the replacement of large, expensive sales force by new channels for e.sales.

6.2. The Present Condition of the Prescription Drug Companies

The strategic response of the large pharmaceutical companies to e-markets remains ambiguous. They do offer static websites offering corporate public relations site but, according to consumer surveys, these are not trusted.54

Unlike most of other industries, such as airlines and automobiles, the characteristic of prescription drug makes it difficult to enter e-commerce. First, even the largest company cannot cover all categories of prescription drugs, which makes for customers inconvenience, because they usually wants to purchase them at once. Second, drug retailers have inventory all categories of prescription drugs of many manufacturers. This is clearly inefficient for particular manufacturer who wants to
start retail business. Third, customers have decided which to buy, before entering
the website.

These reasons explain that retailing business is difficult to earn a profit for
the drug manufacturers. Therefore, almost all prescription drug companies have a
website, but no pharmaceutical companies enter a pharmaceutical retail business.

6.2.1. Application of IT for knowledge management and
marketing (Pharmaceutical B2B)

There are more than four thousand prescription drugs approved by FDA.
Understanding the difference of the drug accurately is difficult for even medical
professionals.

There are about fifty thousand sales representatives who offer prescription
drug information, and their activity is called as "detailing". As a matter of course,
the cost of marketing is huge. The prescription drug industry uses about 30 percent
of the cost per revenue for its marketing activity, and about in-person promotion
occupies three-fourth of the marketing cost.

The Internet driven advisor program would be useful for the detailing. The
typical question of physicians are, "Is the drug dangerous for pregnant people?" "Can
the drug be taken after a patient taking alcoholic drinks?" The advisor gives the
solution to the problem. Physicians become more at ease in using the Internet. The
convenience to physician of 24 hours-a-day, seven days a week, 365 days a year
access to a company's e-sales channel will offer "e-detailing" to physicians routine.
Sales representatives do not have to answer the question of physicians urgently, and can spend their valuable time doing more important tasks. Physicians also welcome because of very quick and 24 hours service. For prescription drug companies, it is clear to be reducing marketing cost, especially of relating sales representatives without prescription drug companies losing physician’s satisfaction.

Online advisor technology will be applied for not only physicians, but also patients. Patients some times face issues of drugs. When patients say, “I forgot to take the medicine this morning. Now it is noon. What should I do?” the trusted advisor will reply, “Well, you take the medicine for noon. Skip the morning”
References


2 Japan and Taiwan R.O.C. are known as possessing government health insurance.

3 Porter, Michael, Competitive Strategy, New York: 1980: Chapter1


Some plans offer a prescription drug benefit as a carve-out option for which members pay an extra premium. Some members, anticipating that they will stay healthy, do not choose this option, hence the difference between the percentages of plans that offer prescription coverage and members who are covered.


A. Pham. 'Drug cost put strain on health insurers.' *Boston Globe*, 18 Mar. 1998:1


*Microsoft Encarta Encyclopedia 99.*, Computer Software. Microsoft Corporation, 1999

*Microsoft Encarta Encyclopedia 99.*, Computer Software. Microsoft Corporation, 1999


Value Chain: 'A process of collaboration that optimizes all internal and external activities involved in delivering greater perceived value to ultimate customer'


*The prescription drug advertising regulations*: 21 CFR 201.1

Prevention Magazine Survey (telephone survey of 1,200 consumers). Apr. 1998

Prevention Magazine Survey (telephone survey of 1,200 consumers). Apr. 1998


Scott Levin Survey

IMS Health Survey
Ostove, Nancy. DDDMAC Dec. 1998


*The prescription drug advertising regulations*: 21 CFR 201.1(e)(1)


Coleman, J. S., E. Katz & H. Menzel *Medical Innovation a Diffusion Study* Bobbs-Merril Co., Inc. 1966


The data is based on divided from the PERQ/HCI database, which is build from the three following studies:

- **Media-Check**: A journal relationship study that monitors approximately 300 medical journals. (Study frequency: Annual, Sample size per report: 7,000)

- **CTS**: A 4-color, direct mail survey that captures campaign awareness, message diagnostics, message penetration, and attitude change. (Study frequency: Bimonthly, Sample size per report: 225-250)

- **CTS-2000**: A 4-color, direct mail survey that measures sales response to promotion (detailing, print, and combination) (Study frequency: Quarterly, Sample size per report: 2,000)


TS&H-Ihoken. D-FAX Regular. 10.6 (Sept., 1999): 7

The Pharmaceutical Industry.' The Economist 21 Feb. 1998: 3

Poste, George. 'The first battleground for regulation of e-commerce.' Financial Times 6 April 2000: IV


Poste, George. 'The first battleground for regulation of e-commerce.' Financial Times 6 April 2000: IV

Poste, George. 'The first battleground for regulation of e-commerce.' Financial Times 6 April 2000: IV
Appendix

Figure 2: Porter’s Five Forces Model

Table 1: 1999 Performa Pharmaceutical Company Ranking

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>World ($bn)</th>
<th>Share (%)</th>
<th>US ($bn)</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Glaxo Smithcline</td>
<td>22.2</td>
<td>7.3</td>
<td>10.3</td>
<td>9.3</td>
</tr>
<tr>
<td>2</td>
<td>Pfizer</td>
<td>20.2</td>
<td>6.6</td>
<td>12.6</td>
<td>11.3</td>
</tr>
<tr>
<td>3</td>
<td>Merck &amp; Co</td>
<td>15.5</td>
<td>5.1</td>
<td>8.5</td>
<td>7.7</td>
</tr>
<tr>
<td>4</td>
<td>AstraZeneca</td>
<td>14.8</td>
<td>4.8</td>
<td>7.2</td>
<td>6.4</td>
</tr>
<tr>
<td>5</td>
<td>Aventis</td>
<td>13.1</td>
<td>4.3</td>
<td>3.5</td>
<td>3.2</td>
</tr>
<tr>
<td>6</td>
<td>Bristol-Mayers Squibb</td>
<td>12.0</td>
<td>3.9</td>
<td>7.7</td>
<td>6.9</td>
</tr>
<tr>
<td>7</td>
<td>Novartis</td>
<td>11.6</td>
<td>3.8</td>
<td>4.1</td>
<td>3.7</td>
</tr>
<tr>
<td>8</td>
<td>Roche</td>
<td>11.0</td>
<td>3.6</td>
<td>3.8</td>
<td>3.5</td>
</tr>
<tr>
<td>9</td>
<td>Johnson and Johnson</td>
<td>10.7</td>
<td>3.5</td>
<td>6.4</td>
<td>5.8</td>
</tr>
<tr>
<td>10</td>
<td>Lilly</td>
<td>9.3</td>
<td>3.0</td>
<td>5.9</td>
<td>5.3</td>
</tr>
<tr>
<td>11</td>
<td>Pharmacia</td>
<td>9.3</td>
<td>3.0</td>
<td>5.3</td>
<td>4.7</td>
</tr>
</tbody>
</table>

* Graxo Wellcome merges with SmithKline Beecham
** Pfizer takes over Warner-Lambert
*** Pharmacia & Upjohn merges with Monsanto

Source: Financial Times 6 April. 2000: II
Table 2: Return Differences Among Industries

<table>
<thead>
<tr>
<th>Industry</th>
<th>Return on Stockholder's equity (ROE)</th>
<th>Return on sales</th>
<th>Total return to investors*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soaps, cosmetics</td>
<td>33.0%</td>
<td>6.9%</td>
<td>40.6%</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>29.1%</td>
<td>13.8%</td>
<td>24.3%</td>
</tr>
<tr>
<td>Beverages</td>
<td>25.6%</td>
<td>8.6%</td>
<td>33.0%</td>
</tr>
<tr>
<td>Scientific, photo, control equipment</td>
<td>22.8%</td>
<td>8.9%</td>
<td>20.7%</td>
</tr>
<tr>
<td>Building materials, glass</td>
<td>22.2%</td>
<td>2.0%</td>
<td>30.1%</td>
</tr>
<tr>
<td>Computer software</td>
<td>21.3%</td>
<td>11.7%</td>
<td>39.6%</td>
</tr>
<tr>
<td>Computers, office equipment</td>
<td>21.1%</td>
<td>6.5%</td>
<td>20.4%</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>21.0%</td>
<td>6.9%</td>
<td>7.4%</td>
</tr>
<tr>
<td>Chemicals</td>
<td>20.5%</td>
<td>6.8%</td>
<td>15.2%</td>
</tr>
<tr>
<td>Electronics, semiconductors</td>
<td>18.5%</td>
<td>5.9%</td>
<td>18.1%</td>
</tr>
<tr>
<td>Diversified financials</td>
<td>18.5%</td>
<td>1.7%</td>
<td>39.9%</td>
</tr>
<tr>
<td>Securities</td>
<td>18.3%</td>
<td>0.5%</td>
<td>43.8%</td>
</tr>
<tr>
<td>Airlines</td>
<td>17.9%</td>
<td>4.6%</td>
<td>7.6%</td>
</tr>
<tr>
<td>Aerospace</td>
<td>17.7%</td>
<td>5.0%</td>
<td>39.9%</td>
</tr>
<tr>
<td>Food services</td>
<td>17.7%</td>
<td>4.3%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Industrial and farm equipment</td>
<td>17.0%</td>
<td>5.3%</td>
<td>29.6%</td>
</tr>
<tr>
<td>Publishing, printing</td>
<td>16.8%</td>
<td>5.8%</td>
<td>24.6%</td>
</tr>
<tr>
<td>Food</td>
<td>16.5%</td>
<td>6.7%</td>
<td>18.1%</td>
</tr>
<tr>
<td>Commercial banks</td>
<td>16.5%</td>
<td>1.3%</td>
<td>40.9%</td>
</tr>
<tr>
<td>Electronics, electrical equipment</td>
<td>16.5%</td>
<td>5.9%</td>
<td>8.4%</td>
</tr>
<tr>
<td>Petroleum refining</td>
<td>16.2%</td>
<td>5.6%</td>
<td>27.1%</td>
</tr>
<tr>
<td>Motor vehicles and parts</td>
<td>16.1%</td>
<td>4.3%</td>
<td>15.9%</td>
</tr>
<tr>
<td>Metal products</td>
<td>16.0%</td>
<td>8.0%</td>
<td>32.9%</td>
</tr>
<tr>
<td>Rail roads</td>
<td>14.9%</td>
<td>4.5%</td>
<td>13.8%</td>
</tr>
<tr>
<td>Food and drug stores</td>
<td>14.3%</td>
<td>6.0%</td>
<td>24.4%</td>
</tr>
<tr>
<td>Pipelines</td>
<td>12.7%</td>
<td>2.9%</td>
<td>66.0%</td>
</tr>
<tr>
<td>Wholesalers</td>
<td>12.6%</td>
<td>3.7%</td>
<td>22.8%</td>
</tr>
<tr>
<td>Specialist retailers</td>
<td>12.5%</td>
<td>5.4%</td>
<td>10.3%</td>
</tr>
<tr>
<td>Insurance: P&amp;C (stock)</td>
<td>12.2%</td>
<td>2.0%</td>
<td>21.7%</td>
</tr>
<tr>
<td>Engineering, construction</td>
<td>12.1%</td>
<td>6.2%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Utilities, gas and electric</td>
<td>11.5%</td>
<td>3.5%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Metals</td>
<td>11.5%</td>
<td>3.8%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Insurance: life, health (stock)</td>
<td>10.5%</td>
<td>0.9%</td>
<td>28.9%</td>
</tr>
<tr>
<td>General merchandisers</td>
<td>10.2%</td>
<td>3.5%</td>
<td>11.9%</td>
</tr>
<tr>
<td>Health care</td>
<td>9.0%</td>
<td>4.7%</td>
<td>-7.6%</td>
</tr>
<tr>
<td>Forest and paper products</td>
<td>6.8%</td>
<td>2.9%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Savings institutions</td>
<td>5.4%</td>
<td>0.3%</td>
<td>22.8%</td>
</tr>
<tr>
<td>Entertainment</td>
<td>4.0%</td>
<td>1.7%</td>
<td>9.3%</td>
</tr>
<tr>
<td><strong>All industries (Fortune 500)</strong></td>
<td><strong>14.1%</strong></td>
<td><strong>3.9%</strong></td>
<td><strong>14.1%</strong></td>
</tr>
</tbody>
</table>

* Including capital gains or losses plus reinvestment of dividends.

Table 3: Top 30 Revenue Companies in Healthcare Industry

<table>
<thead>
<tr>
<th>Rank</th>
<th>1997 Rank</th>
<th>Company Name</th>
<th>Field</th>
<th>1997 Revenue</th>
<th>1996 Revenue</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>Merck &amp; Co.</td>
<td>Pharmaceutical Company</td>
<td>23,637</td>
<td>19,829</td>
<td>19.2%</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Johnson &amp; Johnson</td>
<td>Pharmaceutical Company</td>
<td>22,629</td>
<td>21,620</td>
<td>4.7%</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Columbia HCA Healthcare Corp.</td>
<td>Chain Hospital</td>
<td>18,819</td>
<td>18,786</td>
<td>0.2%</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Bristol Myers Squibb Co.</td>
<td>Pharmaceutical Company</td>
<td>16,701</td>
<td>15,065</td>
<td>10.9%</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>American Home Products Corp.</td>
<td>Pharmaceutical Company</td>
<td>14,196</td>
<td>14,088</td>
<td>0.8%</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Wal Green Co.</td>
<td>Chain Drugstore</td>
<td>13,363</td>
<td>11,718</td>
<td>13.5%</td>
</tr>
<tr>
<td>7</td>
<td>11</td>
<td>McKesson Corp.</td>
<td>Wholesaler</td>
<td>12,887</td>
<td>9,954</td>
<td>29.5%</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>CVS Corp.</td>
<td>Chain Drugstore</td>
<td>12,738</td>
<td>10,945</td>
<td>16.4%</td>
</tr>
<tr>
<td>9</td>
<td>7</td>
<td>Pfizer Inc.</td>
<td>Pharmaceutical Company</td>
<td>12,504</td>
<td>11,306</td>
<td>10.6%</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>Abbott Laboratories</td>
<td>Pharmaceutical Company</td>
<td>11,884</td>
<td>11,014</td>
<td>7.9%</td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>United Healthcare Corp.</td>
<td>Managed Care</td>
<td>11,794</td>
<td>10,074</td>
<td>17.1%</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>Berden Bruinwieg</td>
<td>Wholesaler</td>
<td>11,660</td>
<td>9,943</td>
<td>17.3%</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>Cardinal Health Inc.</td>
<td>Wholesaler</td>
<td>10,968</td>
<td>9,408</td>
<td>16.6%</td>
</tr>
<tr>
<td>14</td>
<td>25</td>
<td>Pacificare Health Systems Inc.</td>
<td>Managed Care</td>
<td>8,983</td>
<td>4,637</td>
<td>93.7%</td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>TenetHealthcare Corp.</td>
<td>Chain Hospital</td>
<td>8,691</td>
<td>7,706</td>
<td>12.8%</td>
</tr>
<tr>
<td>16</td>
<td>15</td>
<td>Eli Lilly &amp;Co.</td>
<td>Pharmaceutical Company</td>
<td>8,518</td>
<td>7,347</td>
<td>15.9%</td>
</tr>
<tr>
<td>17</td>
<td>17</td>
<td>Humana Inc.</td>
<td>Managed Care</td>
<td>8,036</td>
<td>6,788</td>
<td>18.4%</td>
</tr>
<tr>
<td>18</td>
<td>20</td>
<td>Amerisource Health</td>
<td>Wholesaler</td>
<td>7,816</td>
<td>5,552</td>
<td>40.8%</td>
</tr>
<tr>
<td>19</td>
<td>22</td>
<td>Bindley Western Industries Inc.</td>
<td>Wholesaler</td>
<td>7,312</td>
<td>5,319</td>
<td>37.5%</td>
</tr>
<tr>
<td>20</td>
<td>21</td>
<td>Rite Aid Corp.</td>
<td>Chain Drugstore</td>
<td>6,970</td>
<td>5,446</td>
<td>28.0%</td>
</tr>
<tr>
<td>21</td>
<td>19</td>
<td>Schering Plough Corp.</td>
<td>Pharmaceutical Company</td>
<td>6,778</td>
<td>5,656</td>
<td>19.8%</td>
</tr>
<tr>
<td>22</td>
<td>16</td>
<td>Pharmacia &amp; Upjohn</td>
<td>Pharmaceutical Company</td>
<td>6,710</td>
<td>7,286</td>
<td>-7.9%</td>
</tr>
<tr>
<td>23</td>
<td>23</td>
<td>Medpartners Inc.</td>
<td>PPM</td>
<td>6,331</td>
<td>5,222</td>
<td>21.2%</td>
</tr>
<tr>
<td>24</td>
<td>18</td>
<td>Aramark Corp.</td>
<td>Outsourcing (food supply, cleaning)</td>
<td>6,310</td>
<td>6,123</td>
<td>3.1%</td>
</tr>
<tr>
<td>25</td>
<td>26</td>
<td>Wellpoint Health Networks Inc.</td>
<td>Managed Care</td>
<td>5,826</td>
<td>4,170</td>
<td>39.7%</td>
</tr>
<tr>
<td>26</td>
<td>24</td>
<td>Eckerd Corp.</td>
<td>Chain Drugstore</td>
<td>5,376</td>
<td>4,997</td>
<td>7.6%</td>
</tr>
<tr>
<td>27</td>
<td>28</td>
<td>Olsten Corp.</td>
<td>Home Healthcare</td>
<td>4,113</td>
<td>3,378</td>
<td>21.8%</td>
</tr>
<tr>
<td>28</td>
<td>27</td>
<td>Servicemaster Co.</td>
<td>Outsourcing (food supply, cleaning)</td>
<td>3,692</td>
<td>3,458</td>
<td>6.8%</td>
</tr>
<tr>
<td>29</td>
<td>29</td>
<td>Beverly Enterprises Inc.</td>
<td>Nursing Home</td>
<td>3,230</td>
<td>3,281</td>
<td>-1.6%</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>Owens &amp; Minor Inc.</td>
<td>Wholesaler</td>
<td>3,117</td>
<td>3,019</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

Figure 4: R&D in Pharmaceutical Industry

<table>
<thead>
<tr>
<th>Research</th>
<th>Develop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creation, Screening</td>
<td>Div.</td>
</tr>
<tr>
<td>Pre-clinical Development</td>
<td></td>
</tr>
<tr>
<td>Clinical Trial Phase 1</td>
<td></td>
</tr>
<tr>
<td>Clinical Trial Phase 2</td>
<td></td>
</tr>
<tr>
<td>Clinical Trial Phase 3</td>
<td></td>
</tr>
<tr>
<td>FDA Review</td>
<td></td>
</tr>
</tbody>
</table>

Launch

Creation, Screening

Pre-clinical Development
(Animal, Safety and Effectiveness)

Phase I - Clinical studies in usually healthy volunteers
(Safety)

Phase II - Clinical studies in small number of patients (Ila)
Multicenter studies to determine dose range (Iib)
(Safety, Effectiveness, Dosage)

Phase III - Clinical studies in expanded populations
(Effectiveness, How to Use)

FDA Review

After launched, prescription drug continue to be examined for confirm the drug's safety and effectiveness in expanded populations; this process is called as Phase IV.
Figure 5: Dropping Sales of Zantac® after patent expiration in the US

(million dollar)

<table>
<thead>
<tr>
<th>Phase I</th>
<th>Phase IIa</th>
<th>Phase IIb</th>
<th>Phase III</th>
<th>Worldwide Marketing Application</th>
<th>Ongoing</th>
</tr>
</thead>
<tbody>
<tr>
<td>New compounds in a range of therapeutic areas</td>
<td>New compounds in a range of therapeutic areas, including:</td>
<td>• MK663 Second COX-2 Inhibitor Arthritis</td>
<td>• Candidas Cidal Antifungal</td>
<td>• Vioxx COX-2 Specific Inhibitor Submitted for Osteoarthritis and Pain</td>
<td>• Aggrastat</td>
</tr>
<tr>
<td>• Asthma</td>
<td>• Rotavirus Vaccine</td>
<td>• MK-826 Carbapenem Antibiotic</td>
<td></td>
<td></td>
<td>• Cosopt</td>
</tr>
<tr>
<td>• Human Papillomavirus Vaccine</td>
<td>• Substance P Antagonist Depression</td>
<td>• MK-869 Substance P Antagonist Emesis</td>
<td></td>
<td></td>
<td>• Cozaar /Hyzzar</td>
</tr>
<tr>
<td>• Prostate Disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Clixivan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Fosamax</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Maxalt</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Propecia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Recombivax HB</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Singulair</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Trusopt</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Vaqta</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Varivax</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Zocor</td>
</tr>
</tbody>
</table>

Figure 6: Employees Enrolled in Health Plans: 1980 and 1995


Table 5: Joining Rate for Healthcare Insurance in the US (1996)

<table>
<thead>
<tr>
<th></th>
<th>Number of Members (million)</th>
<th>(%)</th>
<th>Growth Rate* (%)</th>
<th>Level of Potential Care Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managed Care Plan</td>
<td>156.8</td>
<td>59</td>
<td>8</td>
<td>Higher</td>
</tr>
<tr>
<td>HMO</td>
<td>60.1</td>
<td>23</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>POS/Open End**</td>
<td>17.2</td>
<td>6</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>PPO</td>
<td>79.5</td>
<td>30</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Non Managed Care Plan</td>
<td>67.9</td>
<td>26</td>
<td>N/A</td>
<td>Lower</td>
</tr>
<tr>
<td>Blue Cross &amp; Shield</td>
<td>31.5</td>
<td>12</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Immunity Insurance Plan</td>
<td>36.4</td>
<td>14</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Non insurant</td>
<td>40.6</td>
<td>15</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total Population</td>
<td>265.3</td>
<td>100</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

* Growth rate is reflected the past three years.
** PPO/Open End is abbreviate "Point of Service"

Source: Nomura Securities International, SMG Marketing, and Blue Cross & Blue Shields Association Data
<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMOs using drug formularies</td>
<td>86%</td>
</tr>
<tr>
<td>Total HMO prescriptions filled by a formulary product</td>
<td>89%</td>
</tr>
<tr>
<td>HMOs using closed formularies</td>
<td>30%</td>
</tr>
<tr>
<td>HMO formularies with</td>
<td></td>
</tr>
<tr>
<td>1000 or more drugs</td>
<td>44%</td>
</tr>
<tr>
<td>500 to 999 drugs</td>
<td>36%</td>
</tr>
<tr>
<td>100 to 499 drugs</td>
<td>19%</td>
</tr>
<tr>
<td>fewer than 100 drugs</td>
<td>1%</td>
</tr>
<tr>
<td>HMOs that allow physicians to override formularies</td>
<td>80%</td>
</tr>
<tr>
<td>HMOs with a representative from a PBM on the Pharmacy and therapeutics committee</td>
<td>34%</td>
</tr>
<tr>
<td>HMOs that review their formularies</td>
<td></td>
</tr>
<tr>
<td>quarterly</td>
<td>50%</td>
</tr>
<tr>
<td>annualy</td>
<td>24%</td>
</tr>
</tbody>
</table>

Source: 'Hoechst Marion Roussel Managed Care Digest Series 1997: HMO/PPO Digest'; Hoechst Marion Roussel: Kansas City, MO 1997: 40-43
Table 7: MCO Pharmacy Benefit Plan's Cost-control Tools

- Formularies (product limitations)
- Generic substitution drug utilization review
- Drug utilization review
- Spending caps
- Step therapy
- Education and compliance programs
- Clinical practice guidelines
- Member cost-sharing arrangements
- Pharmacy reimbursement formula
- Point-of-service (POS) claims management
- Drug utilization review (DUR)

Figure 7: The Value Chain of Prescription Drug Industry

Prescription Drug Companies
- Research Div.
- Development Div.
- Sales & Marketing Div.

Biotechnology Companies
- CROs*

Development request & Result acceptance

Medical Doctors

Pharmacies
- Pharmacists
- PBMs*
- HMOs*

Wholesalers

Patients
- MCO's

Hospitals
- Pharmacists
- Nurses
- Technical Stuffs

Medical care

Information supply & gathering

Prescription

Information supply & gathering

Real Substance (Prescription Drug Supply Chain)

Information

Contract

Original Members of the Value Chain

New Members of the Value Chain

CRO: Contact-Research Organization
MCO: Managed Care Organization
PBM: Pharmacy Benefit Manager
HMO: Health Maintain Organization
Figure 9: Change in the Prescription Drug Marketing

- Insurers & HMO's
- Medical Doctors
- Patients / Customers
- Pharmacies
- Prescription Drug Companies

Indirect Marketing
Direct-to-Consumer (DTC) Marketing
Table 8: Total Expenditure of Prescription Drugs Advertised to Consumers

<table>
<thead>
<tr>
<th>Rank</th>
<th>Brand</th>
<th>Indicated for ...</th>
<th>Marketer</th>
<th>Total promotional expenditure Jan.-June 1999</th>
<th>% Change from Jan.-June 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Claritin line</td>
<td>Allergies</td>
<td>Schering-Plough Corp.</td>
<td>93,271.4</td>
<td>61.4%</td>
</tr>
<tr>
<td>2</td>
<td>Propecia</td>
<td>Hair loss</td>
<td>Merck &amp; Co.</td>
<td>52,156.5</td>
<td>89.7%</td>
</tr>
<tr>
<td>3</td>
<td>Zyrtec</td>
<td>Allergies</td>
<td>Pfizer Inc.</td>
<td>39,105.9</td>
<td>14.4%</td>
</tr>
<tr>
<td>4</td>
<td>Meridia</td>
<td>Obesity</td>
<td>Knoll Pharmaceutical Co.</td>
<td>36,696.6</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Lipitor</td>
<td>Cholesterol reduction</td>
<td>Parke-Davis and Pfizer Inc.</td>
<td>36,090.6</td>
<td>5857.5%</td>
</tr>
<tr>
<td>6</td>
<td>Nasonex</td>
<td>Allergies</td>
<td>Schering-Plough Corp.</td>
<td>35,715.4</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Prilosec</td>
<td>Ulcers</td>
<td>AstraZeneca LP</td>
<td>35,285.7</td>
<td>25.8%</td>
</tr>
<tr>
<td>8</td>
<td>Flonase</td>
<td>Allergies</td>
<td>Glaxo Wellcome Inc.</td>
<td>32,137.9</td>
<td>34.0%</td>
</tr>
<tr>
<td>9</td>
<td>Zypen</td>
<td>Smoking cessation</td>
<td>Glaxo Wellcome Inc.</td>
<td>28,371.4</td>
<td>8.2%</td>
</tr>
<tr>
<td>10</td>
<td>Glucophage</td>
<td>Diabetes</td>
<td>Bristol-Myers Squibb Co.</td>
<td>27,165.1</td>
<td>5018.7%</td>
</tr>
<tr>
<td>11</td>
<td>Detrolix</td>
<td>Incontinence</td>
<td>Pharmacia &amp; Upjohn Inc.</td>
<td>27,071.6</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>OrthoTril</td>
<td>Prevention of pregnancy</td>
<td>Johnson &amp; Johnson</td>
<td>24,974.1</td>
<td>190.1%</td>
</tr>
<tr>
<td>13</td>
<td>Viagra</td>
<td>Erectile dysfunction</td>
<td>Pfizer Inc.</td>
<td>24,173.2</td>
<td>36693.3%</td>
</tr>
<tr>
<td>14</td>
<td>Allegra</td>
<td>Allergies</td>
<td>Hoechst Marion Roussel Inc.</td>
<td>22,771.2</td>
<td>-26.2%</td>
</tr>
<tr>
<td>15</td>
<td>Valtrex</td>
<td>Herpes</td>
<td>Glaxo Wellcome Inc.</td>
<td>22,398.9</td>
<td>21.0%</td>
</tr>
<tr>
<td>16</td>
<td>Zomig</td>
<td>Migraine</td>
<td>AstraZeneca LP</td>
<td>21,534.1</td>
<td>41.6%</td>
</tr>
<tr>
<td>17</td>
<td>Nicotrol</td>
<td>Smoking cessation</td>
<td>McNeil Consumer Products Co.</td>
<td>17,529.3</td>
<td>2436.8%</td>
</tr>
<tr>
<td>18</td>
<td>LYMErix</td>
<td>Lyme disease</td>
<td>SmithKline Beecham</td>
<td>17,122.8</td>
<td>-</td>
</tr>
<tr>
<td>19</td>
<td>Imiflax</td>
<td>Migraine</td>
<td>Glaxo Wellcome Inc.</td>
<td>14,061.2</td>
<td>-39.4%</td>
</tr>
<tr>
<td>20</td>
<td>Aricept</td>
<td>Alzheimer's disease</td>
<td>Pfizer Inc. and Elizal Co.</td>
<td>13,576.7</td>
<td>176.9%</td>
</tr>
<tr>
<td>21</td>
<td>Accolate</td>
<td>Asthma</td>
<td>AstraZeneca LP</td>
<td>13,349.2</td>
<td>-26.4%</td>
</tr>
<tr>
<td>22</td>
<td>CombiPatch</td>
<td>Menopause</td>
<td>Rhone-Poulenc Rorer</td>
<td>12,529.8</td>
<td>-</td>
</tr>
<tr>
<td>23</td>
<td>Novadex</td>
<td>Breast cancer</td>
<td>AstraZeneca LP</td>
<td>11,672.7</td>
<td>-</td>
</tr>
<tr>
<td>24</td>
<td>Patanol</td>
<td>Allergies</td>
<td>Alcon Laboratories Inc.</td>
<td>10,676.6</td>
<td>10.9%</td>
</tr>
<tr>
<td>25</td>
<td>Prempro</td>
<td>Hormone replacement</td>
<td>American Home Products Corp.</td>
<td>10,313.4</td>
<td>2619.8%</td>
</tr>
<tr>
<td>26</td>
<td>Renova</td>
<td>Wrinkles</td>
<td>Johnson &amp; Johnson</td>
<td>8,617.2</td>
<td>72.0%</td>
</tr>
<tr>
<td>27</td>
<td>Rezulin</td>
<td>Diabetes</td>
<td>Warner-Lambert Co.</td>
<td>7,742.9</td>
<td>68.8%</td>
</tr>
<tr>
<td>28</td>
<td>Premarin</td>
<td>Estrogen replacement</td>
<td>American Home Products Corp.</td>
<td>7,366.6</td>
<td>-71.1%</td>
</tr>
<tr>
<td>29</td>
<td>Lamisil</td>
<td>Fungal infections</td>
<td>Novartis Pharmaceuticals Corp.</td>
<td>6,718.2</td>
<td>-36.2%</td>
</tr>
<tr>
<td>30</td>
<td>Nasacort</td>
<td>Allergies</td>
<td>Rhone-Poulenc Rorer</td>
<td>6,316.7</td>
<td>82.9%</td>
</tr>
<tr>
<td>31</td>
<td>Flomax</td>
<td>Benign prostatic</td>
<td>Boehringer Ingelheim</td>
<td>6,064.9</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hypertrophy</td>
<td>Pharmaceuticals Inc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Differin</td>
<td>Acne</td>
<td>Galderma Laboratories Inc.</td>
<td>5,165.3</td>
<td>21.9%</td>
</tr>
<tr>
<td>33</td>
<td>Zocor</td>
<td>Cholesterol reduction</td>
<td>Merck &amp; Co.</td>
<td>4,415.6</td>
<td>-79.8%</td>
</tr>
<tr>
<td>34</td>
<td>Depo-Provera</td>
<td>Prevention of pregnancy</td>
<td>Pharmacia &amp; Upjohn Inc.</td>
<td>4,369.3</td>
<td>-42.9%</td>
</tr>
<tr>
<td>35</td>
<td>Enbrel</td>
<td>Arthritis</td>
<td>American Home Products Corp.</td>
<td>4,071.1</td>
<td>-</td>
</tr>
<tr>
<td>36</td>
<td>Tranuderm</td>
<td>Motion sickness</td>
<td>Novartis Consumer Health Inc.</td>
<td>3,746.3</td>
<td>21.0%</td>
</tr>
<tr>
<td>37</td>
<td>Zithromax</td>
<td>Infections</td>
<td>Pfizer Inc.</td>
<td>3,633.7</td>
<td>-45.5%</td>
</tr>
<tr>
<td>38</td>
<td>Synvisc</td>
<td>Arthritis</td>
<td>American Home Products Corp.</td>
<td>2,625.6</td>
<td>-</td>
</tr>
<tr>
<td>39</td>
<td>Celebrex</td>
<td>Arthritis</td>
<td>G.D. Searle &amp; Co.</td>
<td>2,776.4</td>
<td>-</td>
</tr>
<tr>
<td>40</td>
<td>Preven</td>
<td>Prevention of pregnancy</td>
<td>Gynecetics Inc.</td>
<td>1,964.6</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 8: Total Expenditure of Prescription Drugs Advertised to Consumers (continued)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Brand</th>
<th>Indicated for</th>
<th>Marketer</th>
<th>Total promotional expenditure Jan.-June 1999</th>
<th>% Change from Jan.-June 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>Crixivan</td>
<td>HIV infection</td>
<td>Merck &amp; Co.</td>
<td>1,977.6</td>
<td>60.1%</td>
</tr>
<tr>
<td>42</td>
<td>MetroGel</td>
<td>Rosacea</td>
<td>Galderma Laboratories Inc.</td>
<td>1,667.3</td>
<td>6010.0%</td>
</tr>
<tr>
<td>43</td>
<td>Cardizem CD</td>
<td>Hypertension</td>
<td>Hoechst Marion Roussel Inc.</td>
<td>1,695.9</td>
<td>-</td>
</tr>
<tr>
<td>44</td>
<td>Singularia</td>
<td>Asthma</td>
<td>Merck &amp; Co.</td>
<td>1,396.4</td>
<td>-</td>
</tr>
<tr>
<td>45</td>
<td>Nizoral</td>
<td>Fungal infections</td>
<td>Johnson &amp; Johnson</td>
<td>1,317.1</td>
<td>-</td>
</tr>
<tr>
<td>46</td>
<td>Coreg</td>
<td>Heart failure</td>
<td>SmithKline Beecham</td>
<td>1,269.3</td>
<td>-</td>
</tr>
<tr>
<td>47</td>
<td>Humulin Pen</td>
<td>Diabetes</td>
<td>Eli Lilly &amp; Co.</td>
<td>1,211.3</td>
<td>-</td>
</tr>
<tr>
<td>48</td>
<td>MetroGel &amp; MetroCresm</td>
<td>Rosacea</td>
<td>Galderma Laboratories Inc.</td>
<td>1,164.5</td>
<td>-53.4%</td>
</tr>
<tr>
<td>49</td>
<td>Combivir</td>
<td>HIV infection</td>
<td>Glaxo Wellcome Inc.</td>
<td>650.7</td>
<td>-52.5%</td>
</tr>
<tr>
<td>50</td>
<td>Procrit</td>
<td>Anemia</td>
<td>Johnson &amp; Johnson</td>
<td>744.6</td>
<td>86.8%</td>
</tr>
<tr>
<td>51</td>
<td>Emia</td>
<td>Local anesthesia</td>
<td>AstraZeneca LP</td>
<td>694.6</td>
<td>-</td>
</tr>
<tr>
<td>52</td>
<td>Amaryl</td>
<td>Diabetes</td>
<td>Hoechst Marion Roussel Inc.</td>
<td>562.4</td>
<td>-</td>
</tr>
<tr>
<td>53</td>
<td>Sustiva</td>
<td>HIV infection</td>
<td>DuPont Pharmaceuticals Co.</td>
<td>537.0</td>
<td>4569.6%</td>
</tr>
<tr>
<td>54</td>
<td>Micacalin</td>
<td>Osteoporosis</td>
<td>Novartis Pharmaceuticals Corp.</td>
<td>437.1</td>
<td>897.9%</td>
</tr>
<tr>
<td>55</td>
<td>Fosamia</td>
<td>Osteoporosis</td>
<td>Merck &amp; Co.</td>
<td>399.9</td>
<td>-</td>
</tr>
<tr>
<td>56</td>
<td>Nunplant</td>
<td>Prevention of pregnancy</td>
<td>American Home Products Corp.</td>
<td>381.7</td>
<td>1.6%</td>
</tr>
<tr>
<td>57</td>
<td>Rocephin</td>
<td>Infections</td>
<td>Roche Laboratories Inc.</td>
<td>363.6</td>
<td>-</td>
</tr>
<tr>
<td>58</td>
<td>Zigen</td>
<td>HIV infection</td>
<td>Glaxo Wellcome Inc.</td>
<td>341.1</td>
<td>-</td>
</tr>
<tr>
<td>59</td>
<td>Havix</td>
<td>Hepatitis</td>
<td>SmithKline Beecham</td>
<td>304.2</td>
<td>-46.2%</td>
</tr>
<tr>
<td>60</td>
<td>Dilifluca</td>
<td>Vaginal infections</td>
<td>Pfizer Inc.</td>
<td>293.2</td>
<td>-25.3%</td>
</tr>
<tr>
<td>61</td>
<td>Paxil</td>
<td>Depression</td>
<td>SmithKline Beecham</td>
<td>272.6</td>
<td>-</td>
</tr>
<tr>
<td>62</td>
<td>Viracept</td>
<td>HIV infection</td>
<td>Agouron Pharmaceuticals Inc.</td>
<td>227.9</td>
<td>-50.6%</td>
</tr>
<tr>
<td>63</td>
<td>Flovent</td>
<td>Asthma</td>
<td>Glaxo Wellcome Inc.</td>
<td>194.6</td>
<td>-</td>
</tr>
<tr>
<td>64</td>
<td>Furtoxine</td>
<td>HIV infection</td>
<td>Roche Laboratories Inc.</td>
<td>172.4</td>
<td>54.9%</td>
</tr>
<tr>
<td>65</td>
<td>Ambien</td>
<td>Insomnia</td>
<td>G.D. Searle &amp; Co.</td>
<td>152.3</td>
<td>-</td>
</tr>
<tr>
<td>66</td>
<td>Zovirax</td>
<td>Herpes</td>
<td>Glaxo Wellcome Inc.</td>
<td>145.2</td>
<td>-</td>
</tr>
<tr>
<td>67</td>
<td>Virumone</td>
<td>HIV infection</td>
<td>Roxane Laboratories Inc.</td>
<td>139.3</td>
<td>-36.2%</td>
</tr>
<tr>
<td>68</td>
<td>Marinol</td>
<td>Nausea and vomiting</td>
<td>Roxane Laboratories Inc.</td>
<td>131.9</td>
<td>8.6%</td>
</tr>
<tr>
<td>69</td>
<td>Ditropan XL</td>
<td>Incontinence</td>
<td>Alza Corp. and Abbott</td>
<td>122.9</td>
<td>-</td>
</tr>
<tr>
<td>70</td>
<td>Infergen</td>
<td>Hepatitis C</td>
<td>Amgen Inc.</td>
<td>117.5</td>
<td>-</td>
</tr>
<tr>
<td>71</td>
<td>Serostim</td>
<td>AIDS wasting</td>
<td>Serono Laboratories Inc</td>
<td>91.5</td>
<td>13.9%</td>
</tr>
<tr>
<td>72</td>
<td>Seretide</td>
<td>Asthma</td>
<td>Glaxo Wellcome Inc.</td>
<td>74.3</td>
<td>-</td>
</tr>
<tr>
<td>73</td>
<td>Avandia</td>
<td>Diabetes</td>
<td>SmithKline Beecham</td>
<td>72.5</td>
<td>-</td>
</tr>
<tr>
<td>74</td>
<td>Prozac</td>
<td>Depression</td>
<td>Eli Lilly &amp; Co.</td>
<td>36.7</td>
<td>-97.9%</td>
</tr>
<tr>
<td>75</td>
<td>Raxar</td>
<td>Infectious</td>
<td>Glaxo Wellcome Inc.</td>
<td>31.3</td>
<td>-</td>
</tr>
<tr>
<td>76</td>
<td>Neupogen</td>
<td>Neutropenia</td>
<td>Amgen Inc.</td>
<td>20.7</td>
<td>-</td>
</tr>
<tr>
<td>77</td>
<td>Nicoderin</td>
<td>Smoking cessation</td>
<td>Hoechst Marion Roussel Inc.</td>
<td>11.6</td>
<td>-91.3%</td>
</tr>
<tr>
<td>78</td>
<td>Relenza</td>
<td>Influenza</td>
<td>Glaxo Wellcome Inc.</td>
<td>8.2</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: Totals were restated to exclude expenditures for nonprescription products as determined by MedAd News editors; expenditure includes only those products promoted to consumers in the first half of 1999.


775,880.0 35.6%
Figure 10: DTC Investment Trends 1994-1998
The Dramatic increase in DTC advertising has not been at the expense of physician based promotion

Source:
* DTC Mass Media: Competitive Media Reporting, reflecting investment in mass media (television, magazines, newspapers, outdoor, and radio)
** Physician-Based Promotion: IMS Health Integrated Promotional Services, reflecting dollarized value of in-person promotion and national journal expenditures
Figure 11: Source of Advertisement Expenditure

Source: Scott-Levin's Direct-to-Consumer Advertising Audit (revised)
Consumers: n=140, Physicians: n=177 (multiple mentions)
Figure 12: Rebate Coupon

Distributed with a magazine
Source: Newsweek 31 Jan. 2000

Distributed with a product sample in clinics by sales representative
(obtained from medical clinic in Lincolnshire, IL, Feb. 2000)
At ACTOS.com we are excited to be able to bring you information about ACTOS, a prescription treatment for type 2 diabetes. We are committed to helping you understand diabetes, and improve your knowledge of this important therapy. We encourage you to visit regularly because we plan to update the site with new information.

ACTOS may be used by itself or in combination with other diabetes pills (sulfonylureas, metformin), or insulin to lower blood glucose (blood sugar) in patients with type 2 diabetes. ACTOS may be used in combination therapy when diet plus a single agent does not result in adequate control of blood sugar levels. ACTOS should not be used in type 1 diabetes or for the treatment of diabetic ketoacidosis. Management of type 2 diabetes should also include nutritional counseling, weight reduction as needed, and exercise.

ACTOS is generally well tolerated but is not for everyone. Be sure to ask your doctor or health care provider.
Figure 14: Trends in Prescription Drug Promotion

Source: IMS Health, Private Report, 1999
Figure 15: The number of Visiting and Sales Result

Note: The amount of sales is not actual number, but is trend with many studies. The scale on the graph means the rate of increase.


Figure 16: Relationship - Corporate Impression and Frequent Visiting

Source: Social Information Service (Japan), Dec. 1991
Figure 18: Successive Sets Involved in Consumer Decision Making

Total set ➔ Awareness set ➔ Consideration set ➔ Choice set ➔ Decision

Merck  Pfizer  AHP  Glaxo-Wellcome  TAP  AstraZeneca  HMR
Merck  Pfizer  AHP  TAP  AstraZeneca
Merck  Pfizer  TAP  AstraZeneca
Merck  TAP  AstraZeneca

etc

Table 10: Cost-benefit Analysis

Cost-Benefit Analysis: A formulation in search of data

\[ NSB_i = \sum_{i=1}^{n} \frac{b_i(t) - c_i(t)}{(1+r)^t} \]

- **NSB** = net social benefit of project \( i \)
- **\( b_i(t) \)** = benefits (in money terms) in year \( t \)
- **\( c_i(t) \)** = costs (in money terms) in year \( t \)
- \( 1/(1+r) \) = discount factor at annual interest rate \( r \)
- **\( n \)** = lifetime of product

Note: The primary goal of CBA is to identify projects where NSB > 0. It will also be useful, for allocation within a fixed budget, to rank projects according to their NSB. The major issue for health outcomes in money \( b_i(t) \).